SETTLEMENT AND REOCCUPATION
ALONG QUEEN CREEK,
CENTRAL ARIZONA

AN ARCHEOLOGICAL SURVEY
OF THE SUPERIOR PROPOSED BASE FOR EXCHANGE
(SOUTH HALF)
GLOBE RANGER DISTRICT
TONTO NATIONAL FOREST

BY

J. SCOTT WOOD

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Cultural Resources Report

USDA FOREST SERVICE
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NO. 29

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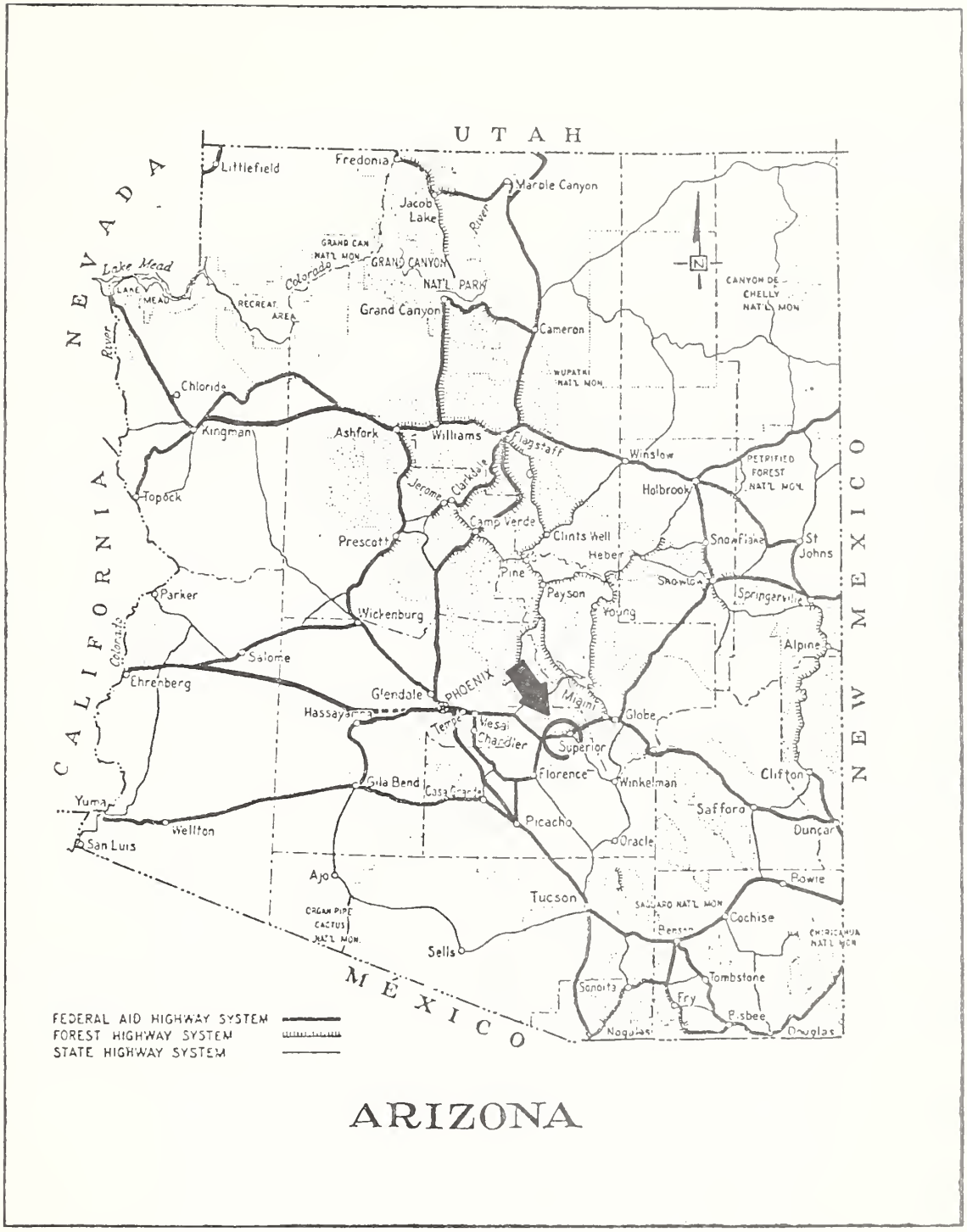
Foreword

The study presented in this volume deals with an archeological survey of National Forest lands made in early 1976. The survey was directed by J. Scott Wood with Brent L. Woodward, Teresa L. Tucker, Adrienne Rankin, Steve Danziger, John Cable, Kent G. Lightfoot, and P. Ryan Fenner as full, part time, and temporary crew members. It was undertaken primarily in order to identify and inventory cultural properties, but also to recover a much wider range of environmental and behavioral information which could be used for interpretive and explanatory purposes as well.

The report presents descriptive data on the natural and cultural resources of the Superior Queen Creek area (Fig. 1). In addition to this are analyses of settlement patterning and site location as they relate to environmental, organizational, and economic factors. Finally, there is a discussion of the relationship between patterns or behavior observed in the prehistoric and historic components in the area as regards mechanisms for the development and collapse of social organizational systems. Though there has been a considerable time lag between the survey and its publication, its findings have been generally supported by more recent work in the area (e.g. Antieau, 1977; Keller, 1978; Stone, 1977; Wood, 1976b; Arizona State University Department of Anthropology (for Wirth Associates), 1976; Yablon, 1978).

In overview, the Superior locality of Queen Creek drainage contained twenty-one prehistoric habitation sites, two limited activity sites (artifact scatters without architecture), and an upland agricultural system involving more than 150 structural features within the surveyed portion of the base for exchange land. This material has been identified as Classic Period Hohokam, and is said to represent what is tentatively introduced as the Queen Creek Phase, a local variant of the larger Soho Phase which centered in the lower Salt-Gila Basin (Fig. 2). After this population had abandoned the locality, it was reoccupied several hundred years later by the historic Anglo townsite of Pinal, the remains of which are now intermingled with those of the prehistoric occupation. The Hohokam population appears to have colonized the locality from some point further downstream on Queen Creek at about 1100 A.D., probably in response to environmental and organizational changes in the larger Hohokam population of lower Queen Creek and the Salt-Gila Basin. It abandoned the area in the early 1300's. While floodplain degradation is seen as a major cause, this abandonment is seen as being in large part a response to the general contraction of the larger Queen Creek Hohokam manifestation. The similarities between hierarchial and chronological patterns observed in this population and those seen in the history of Pinal suggest a strong regional organizational framework for the Classic Period Hohokam, from which small populations such as this one required some active and continued support to remain viable.

The chronology utilized here will be slightly unfamiliar to many readers. It is the result of several years work reassessing traditional chronologies



Map 1. Location of the Queen Creek Superior Locality, Central Arizona.

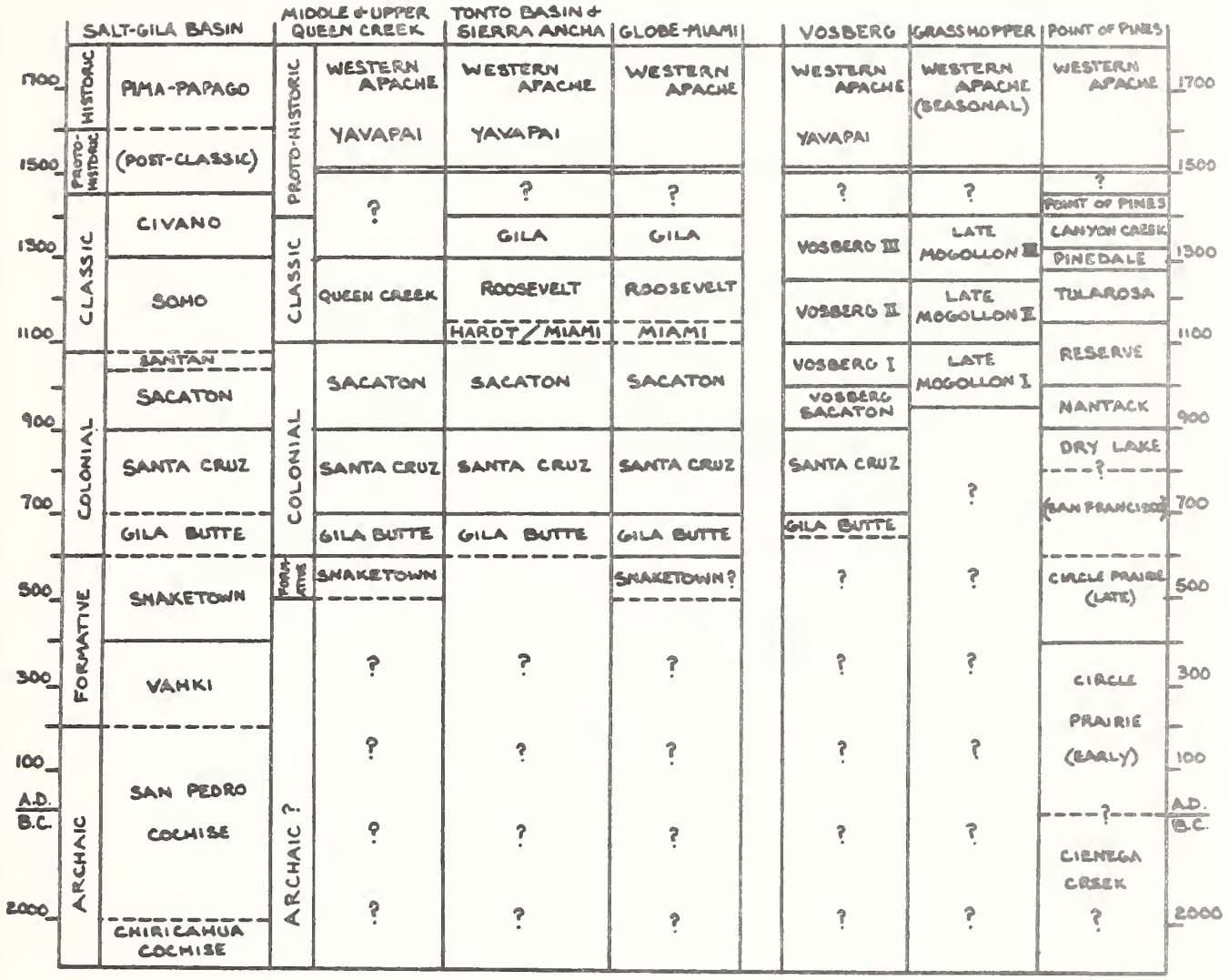


Chart 1. Chronological Sequences for Archeological Traditions, Variants, and Localities in East-Central Arizona (various sections modified from, developed from recent work relating to, or adopted directly from: Breternitz, 1959; Cartledge, 1976; Doyel, 1978b; Haury, 1976; Martin and Plog, 1973; Smith, 1976; Tuggle, 1970; Wood, 1978b; Wood and McAllister, in press; Wood, Ward, and Gasser, 1975).

and their ceramic, architectural, artifactual, and organizational developments, as seen from the perspective of the rather extensive and eclectic Tonto National Forest Cultural Resources Inventory. This work, yet to be fully reported, began as a direct result of the need for a developmental framework in which to evaluate the data recovered during the Queen Creek survey. However, it is only a working chronology at this time, and may undergo various modifications in the future.

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INTRODUCTION

This study follows a clearance survey conducted on a portion of Tonto National Forest base for exchange land (Fig. 1). The purpose of this survey was to determine the eligibility of this land for transfer into private holding, in compliance with Federal legislation, regulation, and Forest policy (Wood, 1977). The design for the analysis which follows included five major objectives:

1. To locate, describe, and assess cultural properties in the Superior locality, a culturally and environmentally distinctive area in the vicinity of Superior, Arizona. The term locality is used here to denote a defined geographic area containing a distinctive cultural assemblage consistently associated over time.

2. To characterize and describe the physiography, edaphics, and vegetation of the area in order to determine local patterns which might relate to human occupation.

3. To locate and describe prehistoric agricultural manifestations in the area to determine the probable subsistence and technological patterns they represent.

4. To determine and describe prehistoric settlement patterning in the area in terms of the relationship of human activity loci or "sites" to patterns in the environment, in order to learn something of the adaptive strategies once operative there.

5. To utilize the data derived from these analyses to explain patterns of change and development within the prehistoric and historic populations of the area.

Two hypotheses concerning the locational associations of sites in this area were developed for testing by this survey. They stem from observations made during a previous survey, along Pinal Creek, near Globe, Arizona. The first of these held that there would be a dichotomy in settlement patterning dependent on the availibility of arable floodplain and/or stream terrace along Queen Creek. The assumption was that wherever a floodplain or terrace was present, there would be relatively large or at least multiple room sites located on the bluffs and ridges overlooking it. In addition, these sites would have a minimum number of agricultural features such as check dams on runoff channels and terraces on ridge slopes associated with them in relation to the number of rooms. Conversely, in areas adjacent to a narrow or lacking floodplain, where the stream flows through a steep-sided arroyo, or where sites were located "inland," away from the creek, they were assumed to be small, one or two rooms, with a high ratio of agricultural features to rooms. The hypothesis called for a difference in ratios of at least an order of magnitude.

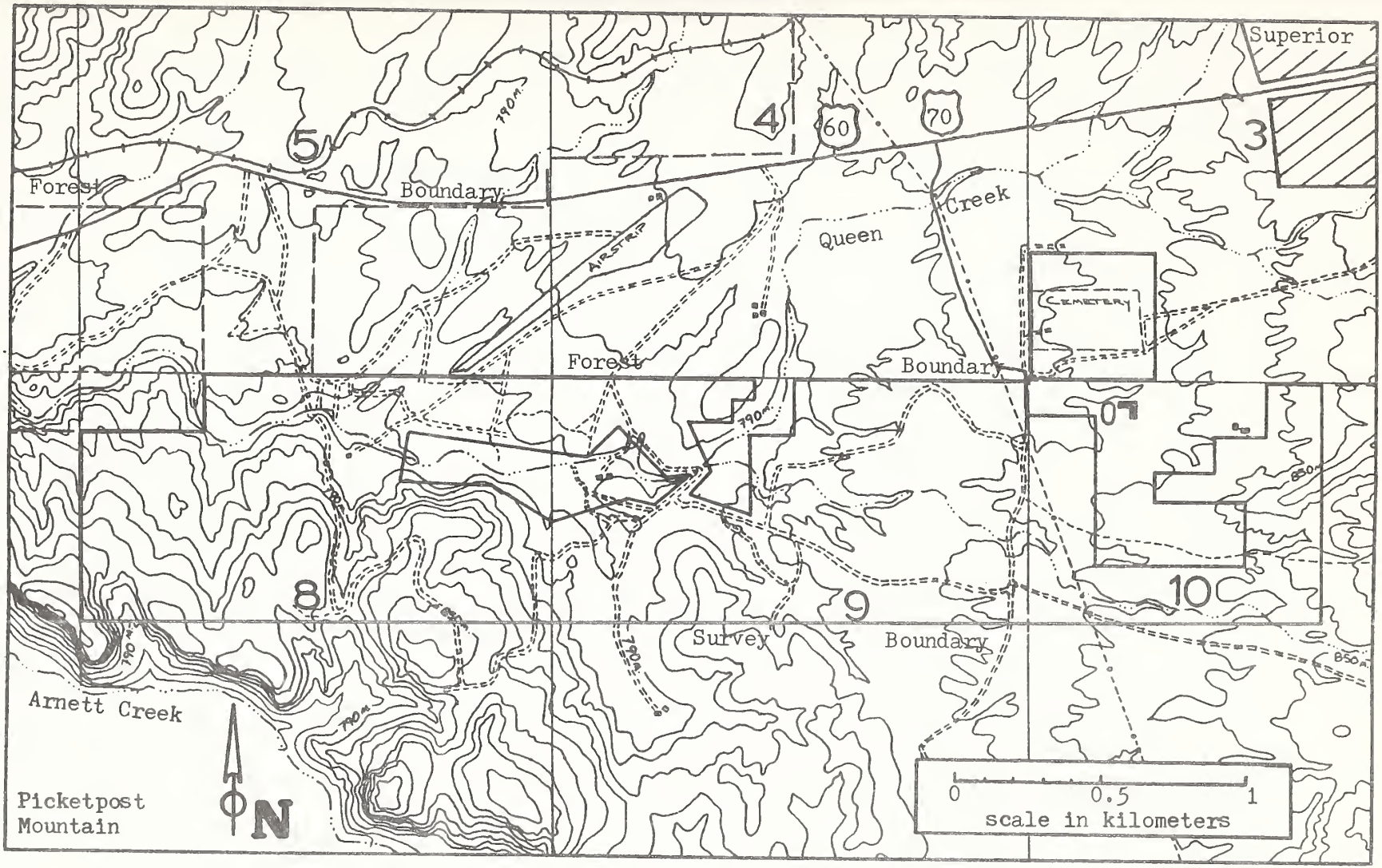

Fig. 1. Location and Boundaries
Superior Proposed Base for Exchange Land
(south half)

The second hypothesis held that site locations should reflect the patterning of particularly important economic species in the vegetation. Specifically, these species are mesquite (Prosopis velutina), saguaro (Cereus giganteus, and jojoba (Simmondsia chinensis), all three of which are known as important food species in the Arizona upland desert. All three as well evidence differential distribution over small geographic areas, reflecting local variability in water, substrate, and drainage (Shreve, 1951). Mesquite, before the introduction of cattle, was primarily a desert riparian plant occupying the floodplains of streams back from the stream margins (Lowe, 1964; Hastings and Turner, 1965). Saguaro is upland species whose distribution is strictly controlled by substrate, drainage, and temperature (Shreve, 1911; 1951). It requires a course, free draining, rocky substrate and is susceptible to hard freezing. Jojoba also requires a rocky upland location (Lowe, 1964), but seems to tolerate finer sediments and less root aeration and drainage than the saguaro, at least at these altitudes. At any rate, the assumption of the hypothesis is that population density, in terms of either site frequency or size, will increase in areas supporting these species, relative to areas where they would be excluded. Furthermore, since there are two major ecological niches represented, it is also assumed that the greatest population density will be found in locations with access to both. For the purposes of this report, then, site locations will be compared to stands of particular associations characterized by these species and reflected in the digitized vegetation descriptive system developed for Arizona by Brown and Lowe (1974). These stands will be mapped with conventionalized "presence/absence" boundaries, bearing in mind the ecotonal character of all vegetative boundaries.

Field Methods

This survey was conducted on foot, in a manner generally accepted as an efficient way to observe ground surfaces and environmental patterns. Crews of from one (myself) to three people walked transects back and forth across the base, which was broken up into smaller parcels with distinct topographic or man-made boundaries, for ease in maintaining controlled coverage.

Since this was to be an assessment of cultural properties on Federally administered land, potentially to lose Federal protection, the survey had to cover 100% of the area in question. In order to accomplish this, crew members walked at intervals of from 5 to 20 meters apart for each transect, depending on the nature of the terrain and ground cover in each of the sub-divided areas. In those areas where the ground surface was easily visible, the intervals between observers were larger than in those areas where ground cover was heavy. The average interval was approximately 10 meters, sufficient to observe all or nearly all cultural remains in the area. Intensity of observation was highest as regards architectural features and large artifact scatters, since their observation is not so dependent on immediate proximity. They can be identified from farther away. Smaller scatters, on the other hand, are more easily disguised by ground cover. For this reason, it was standard practice during the

survey to closely inspect any area where one or more artifacts were observed and to extend this inspection also to those areas which looked especially promising for site location, whether artifacts had been observed or not.

Another aspect of the field methods of this survey concerns the collection of artifacts. Since this land is only potentially to change status or be otherwise impacted, it is Forest policy to leave the resource as much as possible as it was found, in the event that no disturbance is incurred. This required a good deal of field analysis of artifacts. This was confined to broad categories of pottery and lithic types. However, previous work in the area by the author made known the range and expressions of types potentially to be encountered, so that this analysis presented no special problems during the survey. It is not, however, a practice that can be left to unfamiliar or untrained crew members and should not be recommended for use in an unknown area. Nor does it provide quantitive data. However, it is the best approach available for avoiding investigative impacts on archeological sites.

Environment of the Superior Proposed Base for Exchange

Introduction

The Superior proposed base for exchange (Fig. 2) is located within the Basin and Range physiographic province, in the narrow transitional zone between the desert and mountain regions (Wilson, 1962). It lies below a massive cliff known as Apache Leap, formed by rhyolitic lavas at the point where the intrusive plutonic Pinal Mountains contact the northern end of the Dripping Springs Mountains. It is a volcanic area characterized by Tertiary intrusives overlying the Younger pre-Cambrian Apache Group sediments which make up the Dripping Springs structure. The volcanic rhyolite plug known as Picketpost Mountain makes a prominent landmark, just to the southwest of the base. It dominates the skyline west of Superior and is visible from the desert at least 50 km. away.

The proposed base also lies at the edge of the Sonoran Desert, in the lower Sonoran life zone. This zone ranges from near sea level to 1070 - 1220 meters elevation, depending on latitude and exposure. It is characterized by low rainfall, averaging between 75 mm. and 280 mm per year. This rainfall is usually distributed biseasonally, with more or less half of it coming during the summer (Lowe, 1964; Shreve, 1951). The proposed base lies at an average elevation of 790 meters and, owing to its position at the foot of the mountains, receives an orographically enhanced average of 500 mm. of precipitation per year. Most of this falls as rain, but it has been known to snow here during particularly cold winters. Average daily temperatures are about 26°C. maximum and 15°C. minimum, though 38°C. daytime temperatures are common in the summer (Sellers and Hill, 1974). The agricultural potential of this area compares favorably with other Southwestern aboriginal farming zones, e.g. Hopi (Hack, 1942). It has a relatively high rainfall and a very long frost free season, especially for the amount of precipitation it receives (Sellers and Hill, 1974).

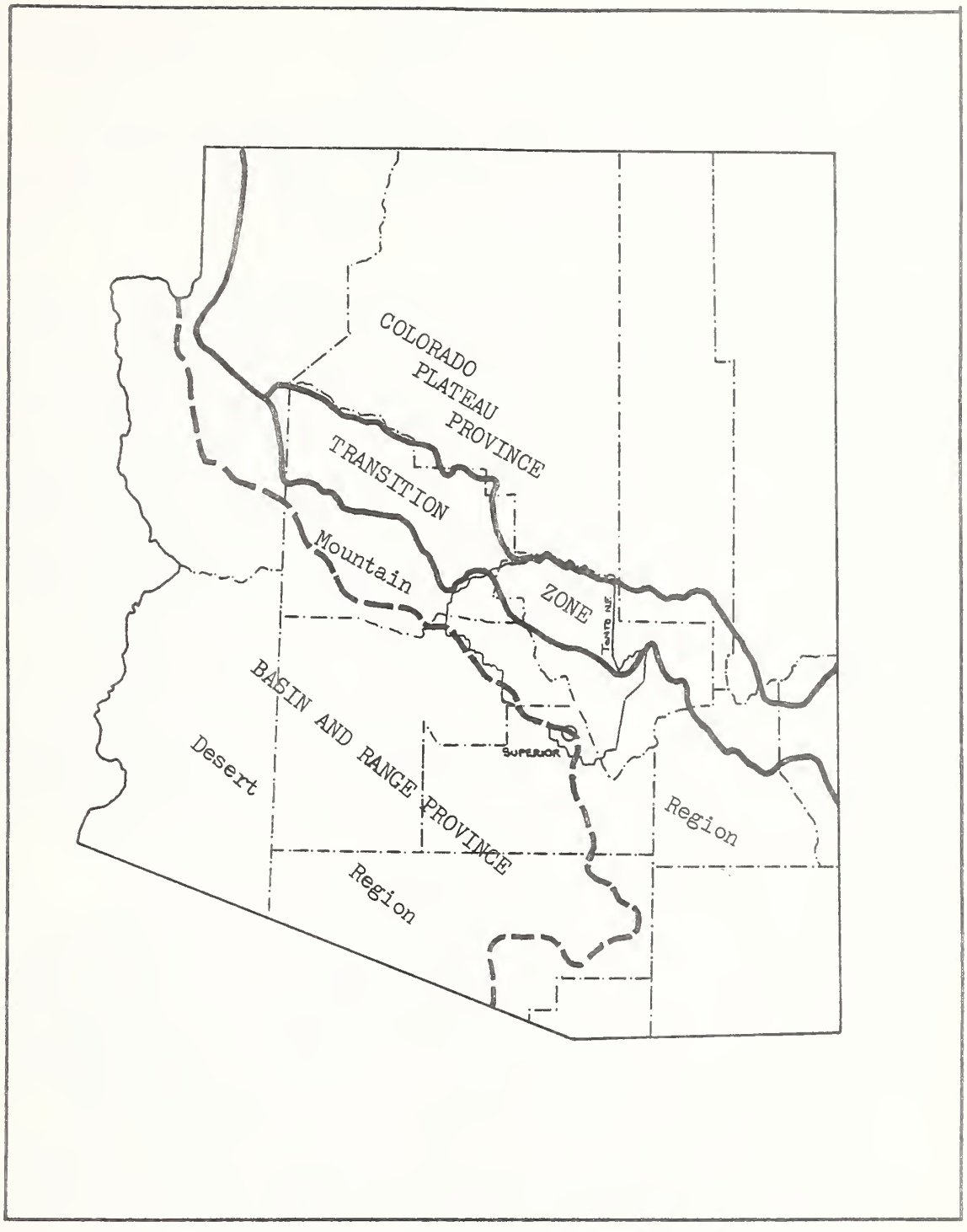

Fig. 2. Location of the Superior-Queen Creek area in relation to the Physiographic Provinces of Arizona

The Arizona upland desert found here is an open stand of microphyllous trees and shrubs with various admixtures of cactus and other types in particular situations (Shreve, 1951). As part of this section of the Sonoran Desert, the Superior area is characterized by a vegetation community dominated by palo verde trees (Cercidium microphyllum) and cactus, predominately Opuntia species and, in local situations, saguaro. Typical of most desertscrub formations, this community is quite variable in its specific expression and contains a number of distinct local stands and wholly different associations.

The major drainage in the area is, of course, Queen Creek, with Arnett Creek and Silver King Wash as its two major tributaries, both of which enter the main stream west of the proposed base. Queen Creek is a more or less permanent stream through the base, Arnett Creek is seasonal, and Silver King Wash is only opportunistic, though there are a number of small springs along the length of this normally dry wash. There is also a single large arroyo tributary to the east, running through the base, and several seasonal washes entering Queen Creek from the north in the vicinity of Pinal townsite. While most of the drainages in the area are opportunistic (and Queen Creek itself is normally dry downstream from the base) it probably was not always so. Before overgrazing damaged the catchment areas of the watershed and disrupted the drainage and runoff potentials, Queen Creek was probably a permanent stream during most of its history, and its tributaries were likewise probably carrying more water on a more regular basis (Schoenwetter, Gaines, and Weaver, 1973).

In terms of its mountainous volcanic geology, higher than average rainfall, and Sonoran upland vegetation, the Superior area is typical of the "edge of the desert" zone in the northeastern portion of the Basin and Range province. This is an area of high topographic, edaphic, and vegetative diversity (Shreve, 1940).

Physiographic Environment

Situated in the volcanic zone west of Superior, the proposed base is characterized by two distinct landform and substrate types. The most extensive is that of the colluvial uplands, an apron of detrital material below the escarpment of the Dripping Springs Mountains. It is made up of boulders, cobbles, and gravels of quartzite, shale, limestone, and conglomerate from the various exposed beds of the Apache Group members making up the mountains. The most imposing features of the base are the lava uplands skirting the foot of Picketpost Mountain. These cliffs dominate the western portion of the base. A third major landform in the base is the streamcourse of Queen Creek. These major divisions can be broken down further into five distinct physiographic zones, presented in Figure 3.

The Colluvial Fan

The first of these zones is the partially dissected colluvial fan in the eastern section. This area is one of gentle slope toward the west at an

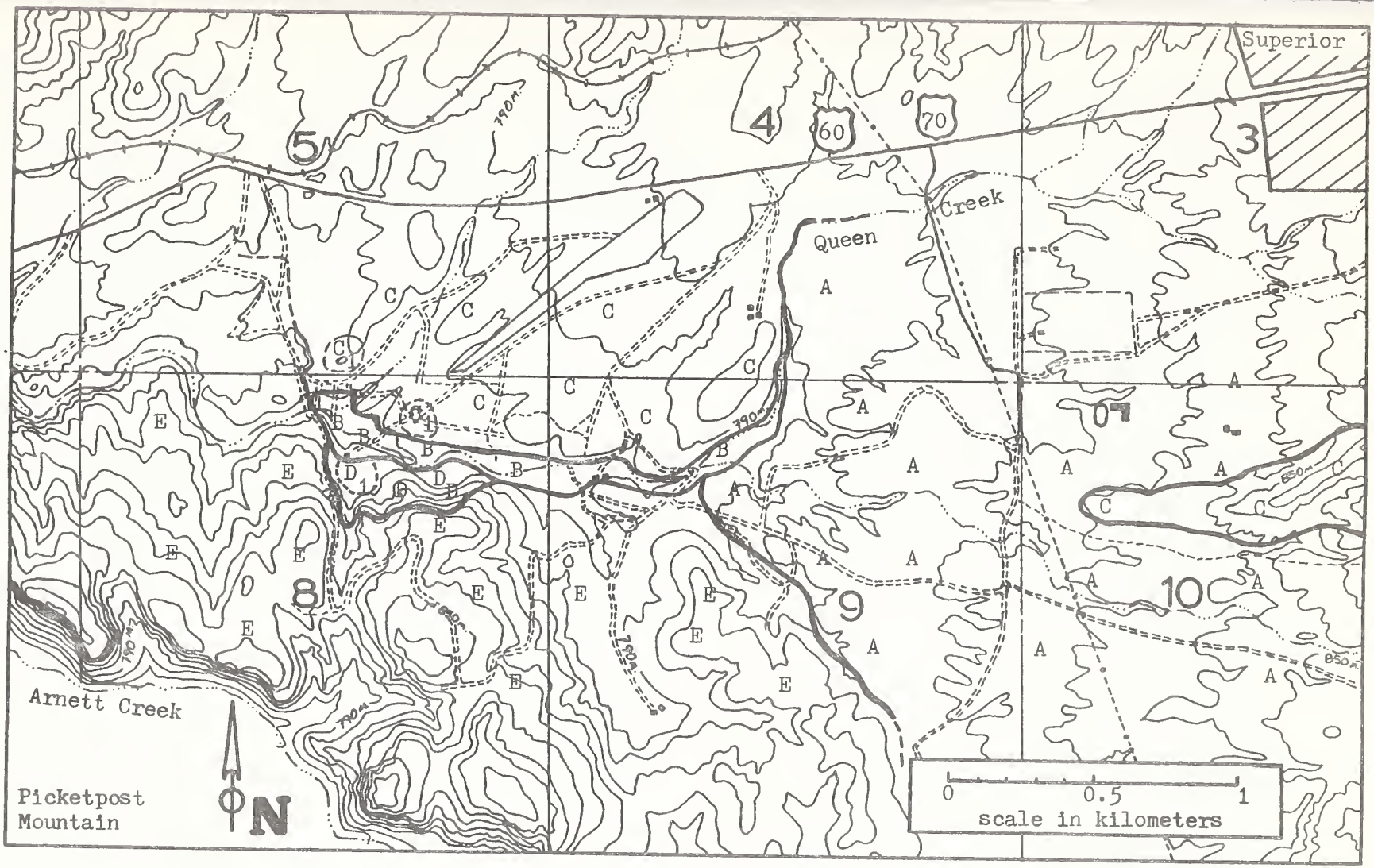

Fig. 3. Landform and Substrate Areas

A-Partially dissected colluvial fan
B-Queen Creek floodplain & terraces
C-Colluvial ridges
C_1-Basalt bedrock colluvial ridges
D-Lava talus and cliffs
D_1-Basalt bedrock, lava talus
E-Rhyolitic lava flow overlying tuff and perlite ashfall

average of 4°. Between the few significant arroyos which cut through this area, the surfaces of the intervening ridges are flat and broad. The colluvial layer of the present surface decreases in thickness going west. In the eastern portion of the base, this mantle of rocks and fine sediment may be as much as 15-20 meters thick. By Queen Creek, it begins to expose its substrate. Runoff channels quickly strip off the colluvium and carve miniature canyons in the soft, fine grained tuff underneath. However, the depth of fill observed in excavated prehistoric structures on the base (see below) indicates that the land below the escarpment is aggrading, despite recent encroachment by channel trenching.

The colluvium matrix is a variable fine sediment ranging from a silty to a sandy loam. Within this mixture the Apache Group rocks provide nearly all the raw materials used prehistorically for building and tool manufacture in the area. The quartzite, especially, was a common material for both chipped and ground stone tools. There are odd pieces of transported non-Apache gneiss and other metamorphics used for hammerstones and other implements. The only raw materials not available in the colluvium are rhyolite and obsidian. These volcanics occur primarily in the lava and tuff beds of the western portion of the base.

Queen Creek

This zone is basically an arbitrary division of the colluvial fan, based on relative relief. There are two sections: a small eastern section, composed of a single ridge system, and a more extensive system in the west. This western group is the result of channeling by the tributaries of Queen Creek coming in from the northeast. Within this section, the highest ridges with the most relief are those at either end, while those in the middle are more or less upland sections between drainages, flat surfaced and sloping toward the creek.

Within the creekside ridge system there are two distinct substrate types. The first is similar to that found in the east - a soft, fine-grained tuff. This rhyolitic volcanic ash is easily worked and quarried and represented a major source of building material in historic times. The other substrate type is a finegrained basalt, blue-grey in color. Underlying the colluvium a small basalt stringer crops out on the higher parts of the ridges and the edge of the bluff in the western area, close to the creek. Soils here contain more clay and are darker than those in the area underlain by tuff.

The Talus

Along the south side of the lava cliffs a steep talus pile has collected on what used to be a stream terrace. This talus is predominately composed of large blocks of lava broken off and fallen from the cliffs. In one area the substrate is not talus but a low grade fumarolic basalt, soft and red to purple in color, similar to volcanic cinders. The slope of this talus is variable between 20° and 30° and is often stepped by differential erosion of the layered ash falls and lava flows cropping out of it.

The Lava Field

In many ways this zone is the most interesting physiographic portion of the base. During the Tertiary volcanic activity of Picketpost Mountain, the area was apparently blanketed several times with rhyolitic ash fall. At the first observable deposition, this ash took the form of a brecciated tuff, as exposed in a ridge just east of the cliffs. This contained whole stream-worn cobbles of a variety of rock types as well as an equal variety of broken fragments, all held in a fine tuff matrix, giving it the appearance of concrete. Subsequent ash falls laid down lenses of obsidian (now mostly hydrated to perlite) within deep, locally variable layers of soft and coarse-grained, finely brecciated tuff or harder, more fine-grained and vitrified tuff. This harder tuff served as the parent material for a variety of bedrock motars along the cliffs. Finally and most recently, the upper surface of the present ridges was laid down as a thick, viscous flow of rhyolite lava. The rugged surface is primarily bare flow features, but there are several small pockets of fine sediment. The lava is dotted frequently with nodules and encrustations of solution deposited chalcedony, formed while the lava was still hot. This and the vitrified rhyolite provided another major prehistoric source of lithic raw material.

Vegetative Environment

The vegetative community of the base is typical lower Sonoran desert. It evidences a variety of associations and stands within any given large area, variable according to substrate, drainage, and exposure (Shreve, 1959). While not as complex as some areas in the desert, there were nevertheless several distinct patterns in this area.

The characterization of vegetative patterns here is according to the digitized system of Brown and Lowe (1974) and used by the Arizona (State) Resources Information Service and, more recently, by the Tonto National Forest and Southwestern Region. According to this system, there are approximately ten identifiable associations in the small area of the base. These ten associations belong to four separate communities. They are presented in Figure 4 in the form of mapped vegetative zones. Not surprisingly, these zones more or less parallel the physiographic zones.

Eastern Upland Zone

Classified as 363.114, this is an association of palo verde, jojoba, and Opuntias (*O. fulgida, O. phaecantha*) with localized stands of saguaro. These plants, which dominate nearly all of the zone, were all important economic resources for the aboriginal populations of the Southwest, providing a variety and abundance of food (Bell and Castetter, 1937; Bohrer, 1962, 1970; Castetter and Bell, 1942; Castetter and Underhill, 1935; Russel, 1908). Mesquite and saguaro provide the two most nutritious foods on the desert (Goodyear, 1975).

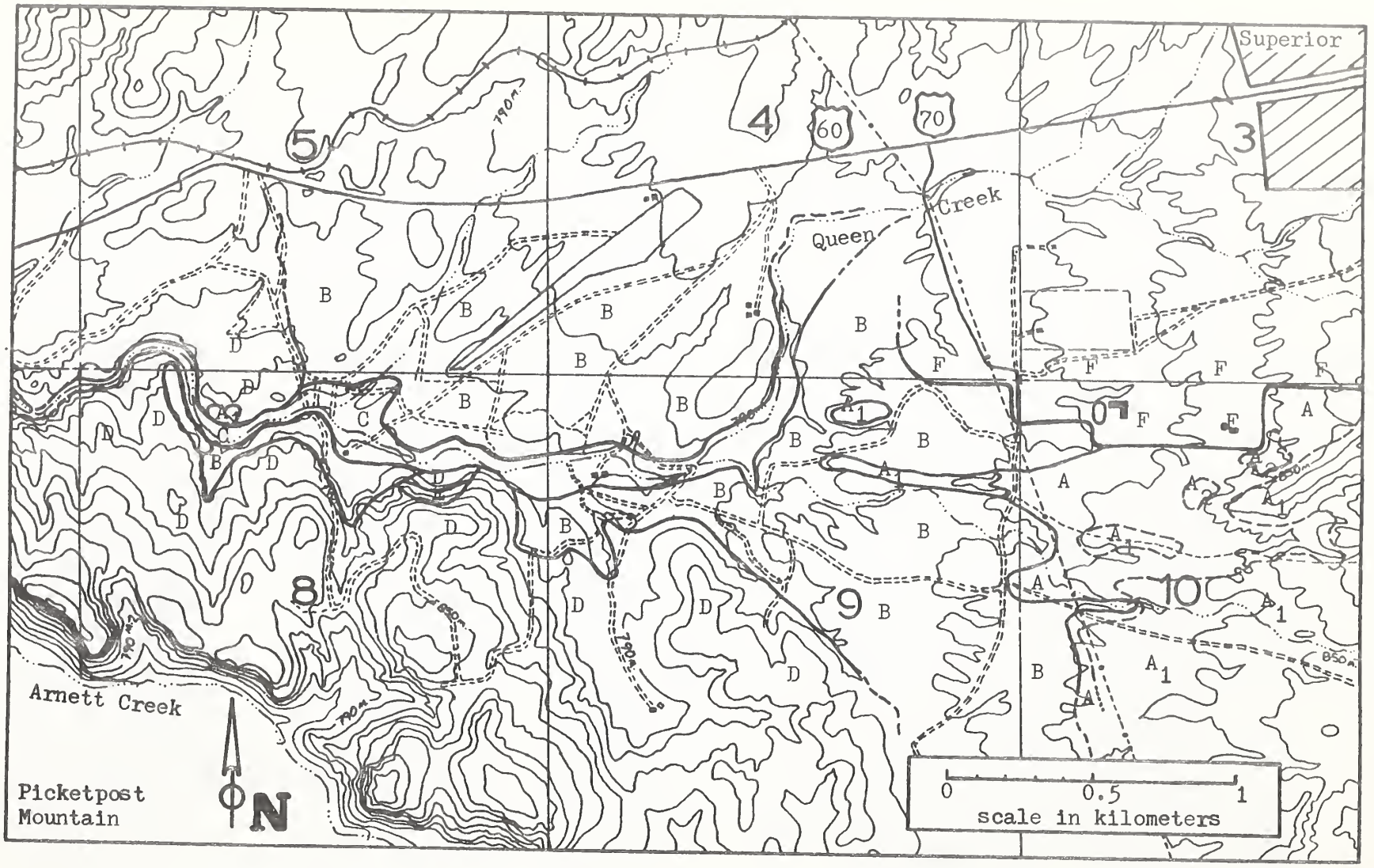

Fig. 4. Vegetation Patterns

A-palo verde-opuntia-jojoba upland
A_1-palo verde-opuntia-jojoba upland with saguaro
A_2-palo verde-opuntia-jojoba upland creosote bush stand
B-palo verde-chainfruit cholla-lycium uplands
C-riparian zone
D-ocotillo-hopbush-palo verde
E-mesquite seep community
F-disturbed surface

This variable stand, usually situated on coarse, rocky colluvium, is not found in areas of finer sediment and more restricted drainage. These conditions limit the distribution of its two distinctive species, saguaro and jojoba, and form the boundary of the association. Within this boundary are local stands and compositions involving, variously, creosote bush (Larrea tridentata), wolfberry (Lycium exsertum), barrel cactus (Ferocactus acanthodes), hedgehog cactus (Echinocereus engelmanii), ocotillo (Fouqueria splendens), brittlebush (Encelia farinosa), fairy duster (Calliandra eriophylla), snakeweed (Gutierrezia sarothrae), burroweed (Haplopappus acradenius), filaree (Erodium cicutarium), and grasses, mostly non-natives introduced with the filaree. The filaree and such European grasses as red brome (Bromus rubens) have succeeded in all but replacing the native grasses in the area. There are also a few agave (Agave murpheyi) co-distributed with the saguaro on several rocky ridge crests.

Central Upland Zone

This is an area of mixed Sonoran desertscrub co-dominated by palo verde (predominately C. microphyllum, some C. floridum), chain fruit cholla (O. fulgida), prickly pear (O. phaecantha), and lycium. Its typical low ground cover is snakeweed, filaree, and red brome. This association is more open than that in the more heavily dissected eastern zone, so that large portions of ridge tops are open snakeweed and filaree flats, giving much of the area the appearance of a parkland, especially in section 9. Overall, then, this zone is classified as 363.226. This classification is a catchall, though, and should not be considered descriptive in itself. Much more specificity can be built into the Brown and Lowe system as it now stands, but it is the only workable system for standardization available. Within the central upland association are several isolated stands of 363.114, usually just a saguaro or two and several jojoba taking advantage of a favorable edaphic situation. There is also a stand of bursage (Ambrosia deltoidea), 363.111, replacing snakeweed in a narrow band running along the line between sections 9 and 10, south of the major wash in the middle of the north half of these sections. (See Fig. 4 for location; stand not specifically delineated.) Finally, there are scattered individuals of mesquite, catclaw (Acacia greggii), barrel cactus, and local stands of Haplopappus. Both this and the eastern zone are cut by narrow bands of mesquite and catclaw along the major washes.

This zone is probably the most heavily grazed of all the five zones, as evidenced by its replaced grass flora, the presence of such "overgrazing plants" as burroweed and snakeweed (Benson and Darrow, 1944), and the introduction of mesquite, lycium, and catclaw, all normally riparian, to an upland situation (Benson and Darrow, 1944; Hastings and Turner, 1965; Kearney and Peebles, 1951; Shreve, 1951; Shreve and Hinckley, 1937). Nevertheless, this area is little changed floristically from its probable prehistoric patterns since it has been desert or desert grassland for thousands of years, with a limited grazing capacity compared to a true grassland, where grazing changes are the most dramatic (Hastings and Turner, 1965; Humphrey, 1958). The chain fruit cholla is known as a "migratory" plant, however, and the present stand does not necessitate a similar stand in the past (Hastings and Turner, 1965; Shreve, 1951).

The Riparian Zone

This zone is made up of two distinct "sub-zones": the terraces along Queen Creek and the channel itself. The terraces represent small mesquite bosques, classified as 333.111. They have an understory of catclaw, snakeweed, and grass. They are bordered on the "inland" side by a "transition zone" of mesquite upland, 363.115. This probably reflects the impacts of grazing. This mesquite area is a very important potential source of food. Between the three zones now described, there would have been a large economic potential for the prehistoric use of tree legumes and cactus (Castetter and Bell, 1942; Goodyear, 1975; Russel, 1908).

The channel pattern is that of a highly mixed mosaic of relict, disclimax, and introduced species in stands comprising narrow concentric bands along the stream. Immediately bordering the water are stands of a variable desert riparian scrub community, 342.42. It includes seepwillow (Baccharis glutinosa), desert broom (Baccharis sarothroides), and seepweed (Sueada torreyana). The salt tolerant seepweed is a byproduct of the incredible pollution of the stream by past mine wastes and present cement plant wastes flowing out of Superior. Just outside of this band of scrub is a discontinuous stand of cottonwood (Populus fremontii) and Goodding willow (Salix gooddingii), interspersed with coyote willow (Salix exigua). Thus, this zone classifies as a cottonwood-willow community, 322,322. Within the canyon of Queen Creek west of the base, the distinction between the terrace and channel communities begins to blur somewhat. The thin sand and boulder bars on the stream washed lava support several cottonwoods, willows coyote willow, mesquite, blue palo verde (C, floridum), catclaw, and a variety of other plants, including escaped cultivars such as date palm. This blends with the desert upland community of the canyon sidewalls to create an elaborate ecotone in contrast to the more strictly segregated patterns to the east.

The Western Upland Zone

This zone is confined to the surface of the lava flow which makes up the southwestern hidge ridges and cliffs of the base. Primarily bare, the rocky surface supports a discontinuous population of desert upland classified a 363.116. Although this is the same classified association as encountered in the central upland zone, there is considerable difference between the two compositions. This again demonstrates the generalized nature of the classification system. The zone as a whole is dominated by hopbush (Dodonea viscosa), prickly pear, ocotillo, and some very poorly developed paloverde. There are also localized stands of agave, brittlebush, and sotol (Dasylirion wheeleri) on the north facing slope above Queen Creek canyon, with an occasional saguaro, on the canyon sidewalls of Queen and Arnett Creeks. Finally, the small sediment pockets on the lava surface often support dense stands of grass, clover, lycium, and prickly pear, apparently holding moisture for considerable periods.

The Cliff Face Zone

This final vegetative zone is probably the most dense and varied community in the area. It is found at the top of the talus below the cliffs, in locations where the tuff underlying the lava is exposed. It has the overall appearance of a more or less mesquite riparian association, 333.112, supported by seeps at the base of the lava. In varying proportions are found mesquite, hopbush, catclaw, wild cucumber (Marah gilensis), wild rose (Rosa arizonica), hackberry (Celtis pallida, C. reticulata), and a wide variety of low annuals and grasses.

Discussion

The zonation or patterning seen in vegetation on the base is primarily a function of substrate. With the exception of the riparian zone, the entire base falls within the characteristics of a typical Sonoran desert upland community. The distribution of particular species within that community is governed to a large part by the distribution of particular edaphic conditions: soil texture, depth, and surface character (Shreve, 1951). Any area in this portion of the Sonoran desert large enough to show edaphic variation will also show patterned vegetative variation directly associated with local sub-strate patterning. These subsurface patterns directly determine the availability of water, nutrients, and appropriate rooting environments.

Environmental Change

Long term pollen studies (Martin, 1963) and the known ecological characteristics of Sonoran desert plants (Kearney and Peebles, 1951) indicate that little in the way of large scale change has occurred in this part of the state over the last several thousand years. Vegetation in southern Arizona is actually more susceptible to short-term cyclical variation than to long-term climatic change (Hastings, 1961). Since it is adapted to aridity and drought, poorer climatic conditions for this vegetation are difficult to achieve and changes resulting in increased aridity are more or less taken in stride by the various physiological and metabolic adaptive mechanisms of individual plants. Better conditions, usually meaning more water, occur from time to time and are met with immediate response. Water brings new growth and an increase in both the population of annuals and in the density and growth of perennials. However, enough change to significantly alter the patterns dictated by substrate and general aridity is even more difficult to achieve than poorer conditions. This can be seen to some extent in the range of rainfall which supports this type of vegetation: from as little as 100 mm. to nearly 500 mm. per year. Thus, Sonoran desert vegetation, with its rapid drought and rain responses, is more reflective of yearly and seasonal patterning than of decadic or climatological patterning (Hastings and Turner, 1965; Shreve, 1951).

The major changes which have taken place in the desert have come over the last 100 years and have been the result of a general shift towards summer dominant rainfall (less effective moisture), mechanical disruption of large areas of land surface, and a disastrous pattern of overgrazing (Benson and Darrow, 1944; Hastings, 1961; Hastings and Turner, 1965; Kearney and Peebles, 1951; Schoenwetter and Dittert, 1968; Shreve, 1951). Some idea of the extent of the grazing impact might be had from the history of the Superior area itself. In the early part of this century, the area immediately around the survey area supported over 1000 head of cattle per year, along with large numbers of goats, wild horses, and burros. As late as the 1950's, this grazing allotment supported as many as 2000 head of cattle in some years. Today it can support less than 500 head, on brush browse and annuals, as the perennial grass cover has been all but eliminated (Robert Maxwell, Globe Ranger District Range Conservationist, personal communication). Added to his, of course, has been a hundred years of land clearing and woodcutting, roadbuilding and mining, and the production of many years' worth of sulphurous smelter smoke by Superior and the towns and camps which preceded it. Fortunately, the effects of these many disturbances have been mitigated somewhat by the fact that this area does have a desert vegetation with limited potential for grazing or other direct use to begin with. The mesquite and lycium common in the uplands today are probably there because of overgrazing. Mesquite has been transported up out of its riparian habitat by way of the digestive tracts of cattle. Lycium, having a poisonous foliage, is avoided by cattle while its competition is being eaten, giving it a distinct survival and reproductive advantage. The dense stands of chainfruit cholla have likewise been caused by cattle, though in still a different way: the animals knock off joints which can reproduce vegetatively. Finally, the "overgrazing" plants such as snakeweed, burroweed, and filaree (a Spanish exotic), have been concentrated and encouraged by the same competitive advantage given the lycium. Nevertheless, the differences are primarily of relative percentages rather than of available species. The major change has been the loss of perennial grasses and the "closing in" with brush and scrub of what was probably once a more open canopy. The Sonoran upland desert prior to grazing was almost always described as much more open with a much higher percentage of perennial grass (Hastings and Turner, 1965). All those species here today (except the Europeans) were present before, in or near the area, but with different relative frequencies. Overgrazing and other disturbances cannot create plants, though they can bring about extinctions: they serve to concentrate some species at the expense of others. They provide a stress and a differential competitive advantage relative to that stress. The higher grass percentage in the reconstructed prehistoric upland association postulated here is more or less expressed in the pollen records recovered from several archeological sites excavated on the base in the last several years (James Schoenwetter, personal communication).

Archeological Background

Prehistoric

Prior to this investigation, made in early 1976, with followup study since then, there was little in the way of prehistoric archeological material or survey data reported from the Superior. A brief survey and description of the Rogers Canyon cliff dwellings in the Superstition Mountains was made in the early 1940's (Smith, 1941) and a large ruin called Togetzoge was excavated in the vicinity of Pinal Ranch (see below) in the early 1920's (Schmidt, 1926), but these areas are 15-25km. from Superior and probably represent different populations from that along Queen Creek. The Tonto National Forest Cultural Resources Inventory listed only 10 sites in the actual vicinity of the base. These were originally recorded by the Arizona State Museum during a survey of the Boyce-Thompson Arboretum and its environs, which are adjacent to the proposed base western boundary. These sites included two small boulder masonry structures described as of 7 and 10 rooms overlooking Queen Creek. Revisitation proved these size estimates to be greatly inflated. Most of the remainder of the sites were artifact scatters along Queen Creek and Arnett Creek. Two other sites distinctive from these were also recorded in the Arboretum inventory. One was an early recording of a portion of Pinal Townsite as "Camp Pinal". This was apparently in reference to the military post once briefly located there. It is not known if the entire townsite was investigated, though it seems unlikely - the inventory appears to be little more than a literary reference. The other site was a series of twelve dry-laid rock masonry circular structures on a lava ridge crest inside the Arboretum. Known locally as "sleeping circles" and recognized elsewhere in Arizona as possible defensive structures (see below), the only artifacts associated with these distinctive structures were Wingfield Red ceramics. The only other site inventoried in this area prior to the survey date was one listed by Arizona State University, which turned out to be a slightly different recording of one of the State Museum sites. Finally, just prior to this survey, the earliest phases of the so-called Superior Land Exchange Project, carried out by L. D. Smith (see Smith, 1976), located AR-03-12-02-88 and subsequently five other sites and features, all located within a portion of the south half of the Superior proposed base.

This survey follows on the excavation to test for National Register eligibility of the six sites located by Smith's project on the proposed base. These sites were excavated under Smith's direction and are currently undergoing analysis. Excavation and analysis notes kept by myself during this project, combined with surface observations from the subsequent survey, allow a preliminary view of the relationships between the cultural properties of this area and those of its surroundings in order to provide some background for the present study.

The observable prehistoric material relationships between this area and others in Arizona involve ceramic, architectural, and agricultural similarities. As will be discussed below, the material complex found here

has specific artifactual similarities to the Salt River Valley Hohokam Classic Period (eg. Wood, Ward, and Gasser, 1975) and to the Hohokam assemblage of the lower and middle Queen Creek drainage (Schoenwetter, Gaines, and Weaver, 1973).

In addition to these strong ceramic and architectural associations, the Superior locality has other architectural, locational, agricultural, and ceramic similarities to Hohokam assemblages of the middle and lower Verde River (Gladwin and Gladwin, 1930; Canouts, 1975; Fuller, Rogge, and Gregonis, 1976), to Sedentary and Classic Hohokam assemblages in the Cave and Camp Creek drainages (Ayres, 1967; Holliday, 1974; Smith, 1974; personal observation), to Sedentary and Classic Period Hohokam assemblages of the middle Agua Fria-New River-Perry Mesa-Squaw Creek area (Fish, et al., 1975; Gumerman, Weed, and Hanson, 1976; personal observation), and, finally, to the ill-defined but strongly Hohokam Salado assemblages of Rye Creek (Gladwin, 1957), Tonto Basin (Steen, et al., 1962; Fuller, Rogge, and Gregonis, 1976; Wood, 1976a), and the Globe-Miami area (Doyel, 1978b; Schmidt, 1926; Wood, Woodward, McAllister, in prep.). Thus, the Superior assemblage is materially and distributionally similar to a number of Hohokam and Salado assemblages found elsewhere in central Arizona in the 11th, 12th, 13th and 14th centuries A.D., and as such it appears to be part of a larger areal archeological tradition.

Taking this a step further, the sometimes slab-based boulder masonry semi-pit structures excavated at Superior are identical to structures excavated along Miami Wash near Globe (Doyel, 1978b). They are also indistinguishable from late Sedentary and Classic Period structures found along middle Queen Creek, Cave Creek, and Camp Creek (personal observation). These boulder outline and boulder/slab masonry structures are known from Hohokam sites in the Cave Creek - Agua Fria area as early as Sacaton Phase (900-1100 A.D.) and they become common throughout the areas peripheral to the Salt-Gila valleys in the 1100's (Ayres, 1967; Fish, et al., 1975; Gumerman, Weed, and Hanson, 1976; Rodgers, 1974; Smith, 1974; Weaver, 1974). Though it is still common to hear Hohokam spoken of only in terms of unchanging, non-differentiated, non-masonry pithouses and Red-on-buff pottery, it is increasingly clear that this tradition was fully as variable as any other in the Southwest. It incorporated a variety of artifactual and architectural forms, developing over time and in different areas, and, in the same manner as other Southwest traditions, involved regional variation within a general pattern of technological, organizational, and settlement locational patterns (e.g. Doyel, 1978a).

The check dam and terrace agricultural construction patterns prominent at Superior are similar to such systems known from a wide variety of areas in Arizona, from Cave Creek to Point of Pines (Holliday, 1974; Rodgers, 1970; 1974; Canouts, 1975; Woodbury, 1961), and seem to represent a common upland agricultural adaptation known by and/or available to most prehistoric groups in the Southwest (Plog and Garrett, 1972).

For the remainder of this report, the Superior materials will be assumed to belong to the Hohokam archeological tradition. The major reason for

including these materials in this tradition, despite strong similarities to certain Salado variant assemblages, comes from the even greater similarities between these materials and those from the Hohokam assemblage of lower and middle Queen Creek, specifically as expressed at AZ U:11:2 ASU and AZ U:11:3 ASU (personal observation). These are two contiguous Hohokam sites occupied from the Colonial Period through the Classic Period, located on an upper terrace of lower Queen Creek near Florence Junction. Aside from the obvious similarity in drainage being used and the physical proximity between the two localities, the artifactual and architectural patterns of the two areas are essentially identical. The pottery types of the Classic Period lower Queen Creek site were all shared with those of Superior - Gila Red, phyllite-tempered Gila Red, Wingfield Plain, Brown, and Red, and a sand tempered Gila Plain (Salt variety). There was also a very finely made, almost entirely micaceous (schist) variety of Gila Plain which often has the appearance of Vahki Plain and which seems to have been a characteristic local product specific to the Queen Creek drainage during the time prior to the Classic Period. Likewise, the apparent percentage of basalt hammerstones and vesicular basalt metate fragments, referring to those items utilizing the same particular type of material, was high in both localities (though the vesicular basalt metate fragments from Superior were confined to a specific group and class of sites). Finally, architectural units observed at AZ U:11:3 ASU are identical to many of those observed at the Superior locality. Both involved coursed and uncoursed boulder masonry walls lining pits and extending a meter or two above the ground (see below). Despite all this, the similarities with Salado assemblage sites from several localities are often nearly as strong and the Superior materials might be considered by some as associated with that assemblage.

Assuming that Salado exists south of the Sierra Anchas as an entity separable from Classic Period Hohokam, the cultural boundaries which distinguish the two traditions are presently too vague to deal with as other than gross generalities. All that can be said at this point in time is that the two expressions are very much intergraded - especially where they meet at the edge of the desert. The Hohokam tradition still awaits general recognition of many of its own Classic Period characteristics. Several of these, such as extensive and elaborate upland agriculture or stone masonry construction, were mentioned above. Much more work is needed before it can be determined whether the traditional boundaries and differences between these two phenomena are real. The premise here is that they are to a large degree not real, and that most of what has been called Salado is in reality better defined as an eastern regional variant of the larger Hohokam tradition, and was probably a participant in what has been called the "Hohokam Interaction Sphere" (Grebinger, 1976) or a larger multi-regional complex hierarchical political-social-economic system which centered on and originated from the Salt-Gila Basin (McAllister and Wood, in press; Wood and McAllister, in press).

Historic

The history of the Superior area in Anglo times has been largely concerned with mining. Since 1870, at least four towns and one military post have been located in or near the canyons of Queen Creek. Though the area had been known of for some time, Anglo activity there did not really begin until 1870. Late in that year a temporary military construction camp was established on what would later be called Queen Creek by order of General George Stoneman. Stoneman, once a quartermaster with the Mormon Battalion, had recently arrived in Arizona to take very brief command of the Arizona Territory Department of the United States Army. The camp, named Picketpost, was set up to construct a road into the eastern mountains, to open them up for mining settlement, and to supply transport for military operations to be directed against the Apache. After a brief inspection tour of military installations in the Territory, Stoneman was convinced (wrongly) that only the Pinal and Tonto Apaches were still hostile to Anglo settlement (Marion/Powell, 1965). One aspect of construction having potential archeological significance was the reported manufacture of bricks by the camp's soldiers, using clay quarried from an unknown location nearby (Woody and Schwartz, 1977). By 1871 the road, known as the Stoneman Grade, was completed, climbing up from what was later to become the site of the town of Silver King to cross the face of the Dripping Springs Mountains. From there the road became a trail that ran through the interior basins of the Queen Creek headwater and upper Pinto Creek drainages, ending at a place known as Mason's Valley. The route was supposedly selected by Stoneman himself, riding a mule, in July of 1870 (Woody and Schwartz, 1977), though records of the period place the General at Camp Verde at that time, making the first inspection trip of his new command (Marion/Powell, 1965). On completion of the road, the small command was moved from Picketpost to establish a new outpost in Mason's Valley, from which to conduct military operations on a more permanent basis. This new post was named Camp Pinal. On May 2 of the same year, following his indirect association with the April 30 Camp Grant Massacre, Stoneman retired to a ranch in California, having been relieved of command by the President and replaced by General George Crook (Smith, 1967). However, while President Grant's outrage over the murder of defenseless Apache women and children, organized by several of the leading citizens of Tucson, may have served as a public focus for criticism, Stoneman's replacement was more probably an inevitable result of his very poor assessment of the military situation in Arizona, which he expressed in a report made public in April of 1871 (Marion/Powell, 1965). Camp Pinal was abandoned in 1872 as Crook took the Apache campaign away from the relatively harmless Pinal Apache to the Chiricahua Apache of southeastern Arizona (Woody and Schwartz, 1977). Years later the Stoneman Grade and trail became the road to Globe and, in 1877, the Camp Pinal location and the single log building it still contained were taken over for farming and ranching by Robert Irion. Highway 60 now runs through this valley, known as Pinal Ranch. That one log building, with some modification, still stands and remains in use today.

A variety of exsoldiers, miners, and assorted adventurers passed through the area in the few years immediately following the demise of the Army camps. They remained only in small numbers, prospecting and mining small ore bodies that were as quickly abandoned as found. The first mine was located in the area in 1872 - the Silver Queen. It was situated in the immediate vicinity of present day Superior and formed the basis of the later Magma Copper Company's development in that town. However, the mining did not continue very far into the 1870's without the protection of the Army. Repeated raids by the Apache forced the mine's founders to abandon the operation and the area in 1873. Its major historic contribution at this early period was the changing of the name of the creek which ran through the area from Picketpost to Queen Creek.

In 1876 the Silver King mine was found at the foot of the Stoneman Grade by an ex-soldier named Sullivan who had worked on the Grade. He had first seen a part of the ore body when working the road, but had been unable to relocate it until this time. Sullivan and his partners Mason and Copeland quickly demonstrated the wealth of the mine and a small town was soon established around it in a small, steep-sided valley below King's Crown Peak, just a few miles north of the earlier Silver Queen discovery and the later development of Superior. Other mining camps and towns soon sprung up rapidly in the area. Among these were Queen (or Queen Creek) and Hastings, located where Superior was founded in 1900. The largest and most important of these was Pinal (sometimes called Pinal City), some six miles southwest of Silver King. Some of the remains of this town are now held within the base (Granger, 1960; Sherman and Sherman, 1969; Wilson, 1976; Woody and Schwartz, 1977) and were identified by this survey.

The history of Pinal was typical of many of the so-called "boom towns" that mining brought to Arizona in the last half of the 19th century. In 1877, following the opening of the Silver King mine, an area along Queen Creek was bought by the mine for the purpose of establishing a mill. Previously the location had been part of a cattle ranch owned by one L. DeArnett (Wilson, 1976) or William G. Arnett (Granger, 1960). Before that it was the site of Camp Picketpost. The new townsite provided a reliable water supply for the milling operation and for the townspeople - a major drawback to living at Silver King was the lack of water (Wildman, 1977). By 1878 a town was well established around the mill and was called Picketpost, as was the imposing volcanic butte which overlooked it. The raw ore from Silver King was concentrated at the new mill before shipping to San Francisco for smelting and refining. In 1879 the town had grown considerably and its name was changed to Pinal, probably reflecting its residents' faith in the central role their town would play in the future of the new county by that name (Sherman and Sherman, 1969; Wilson, 1976). As things developed, the name proved to be too optimistic.

At one time during its brief ten years of life, which ran from about 1878 to 1888, Pinal boasted 123 buildings, including a school with 50 or more students, two churches, a bank, a Wells Fargo office, a Mason's and an

Odd Fellows lodge, several hotels, a brewery, saloons, restaurants, gambling houses, and two newspapers, one of which was the relatively famous Pinal Drill, a bilingual weekly edited by James DeNoon Reymert. Reymert was a Norwegian by birth, a lawyer by profession, and a mine owner, publisher, and entrepeneur by avocation. During his years in the Pinal area he also founded two other small towns southwest of Picketpost Mountain - Reymert and DeNoon. Another famous personage in the history of Pinal was Mattie Earp, who drifted into Pinal in despondency after being abandoned by a faro dealer and part-time lawman named Wyatt. Mattie eventually committed suicide and is reportedly buried in or near Pinal (Waters, 1960). The identification of a small cemetery dating at least in part to the Pinal occupation (see below) may allow the eventual location of her grave.

At its peak, Pinal had a reported population of some 2,000 or more. It became a major stage stop on the road to Globe and was second only to Florence in its economic and social importance to Pinal County. Nevertheless, two things happened in 1888 which combined to spell the end of the town. Silver prices dropped on the world market at the same time that the main vein in the Silver King Mine began to run out (Wildman, 1977). The mine closed. By 1891 the Post Office was shut down and the town was essentially abandoned (Sherman and Sherman, 1969; Wilson, 1976). Today just over forty stone building foundations and adobe house mounds are visible at the townsite and little remains of the mill but parts of its quarried stone foundation, large piles of broken rock, and tiny scraps of steel plate. Even these are rapidly disappearing, though, under the nearly constant onslaught of pothunters, treasure hunters, and "relic collectors." Hopefully, site development and interpretive proposals now being formulated will help to alleviate the problem, as will continued and vigilant law enforcement.

With the closing of the Silver King, mining in the area did not stop entirely. In 1900 the Arizona and Lake Superior Mining Company reopened the old Silver Queen mine and laid out the town of Superior on the site of what had been Hastings. In 1904 this company was bought out by the Magma Copper Company which still owns and operates nearby mines. The silver aspect of mining in the Superior area has all but died out - the metal of consequence today is copper. This has provided a measure of economic and social stability to the area for nearly 80 years. Other mines in the vicinity now produce Apache tears (obsidian nodules) for jewelry and perlite for the manufacture of cement from the ash beds of the extinct volcano known as Picketpost Mountain.

Parcel Description

The area surveyed for this project (Fig. 1) consists of essentially a transect one-half section or 0.8 km. wide running east-west and intersecting a portion of Queen Creek. It constitutes approximately one-half of the proposed base around Superior. Portions of this area have already been conveyed into private holding or have been so held since before the creation of the Tonto National Forest. The largest private holder in

this particular portion of the proposed base is the Magma Copper Company. There is also an outlier section under special use permit which contains the present cemetery of Superior.

The choice of this parcel for the study project was both fortuitous and calculated - fortuitous in the sense that it happened to be there in this form and calculated in the sense that it provided a place which would meet certain criteria for the evaluation of the hypotheses. Essentially what was desired to test the hypotheses developed from the Pinal Creek surveys was a strip of land along a more or less perrennial stream in the Sonoran Desert uplands which would encompass the greatest possible range of environmental variation in a small area. This strip has done just that, as it includes portions of a desert upland, a creek area, and a rugged "mountainous" back country; the same type of patterning seen at Pinal Creek. This range of topogrpahy also allows a variety in vegetation patterns and in hydrography. Drainage in the uplands is ephemeral while Queen Creek is more or less a permanent stream, at least above the Arboretum.

Site Descriptions

Site Designation

The prehistoric and historic sites located in this survey were given two sets of numbers during the survey. The first, of course, was in the Forest Service inventory designation system. The second, used here only for those sites located off of Forest lands, was in the Arizona State University designation system.

For the purposes of the survey and this report, "site" was defined fairly loosely as a concentration of artifactual materials with a reasonably distinct area and boundary. Sites recorded by this survey are described below and in Figures 5-34. Figure 5 also shows the distribution of sites recorded to the north of the base survey, in and around the former Lakeside Land Exchange parcel. These sites, shown by open circles in the figure, served to confirm patterning inferences made during the base survey (see below).

Excavated Sites

As these sites are to be dealt with in greater detail in the long-awaited excavation report being prepared by Smith, they will only be summarized here.

AR-03-12-02-88 was a one or two room boulder masonry - founded semi-pit habitation structure with several slab faced walls and an adjacent brush walled outdoor work area partially outlined with rocks. Trash mounds at the site appeared to represent some duration for its occupation.

AR-03-12-02-89 and AR-03-12-02-90 turned out to have been agricultural features. Isolated features of this type were not usually given site

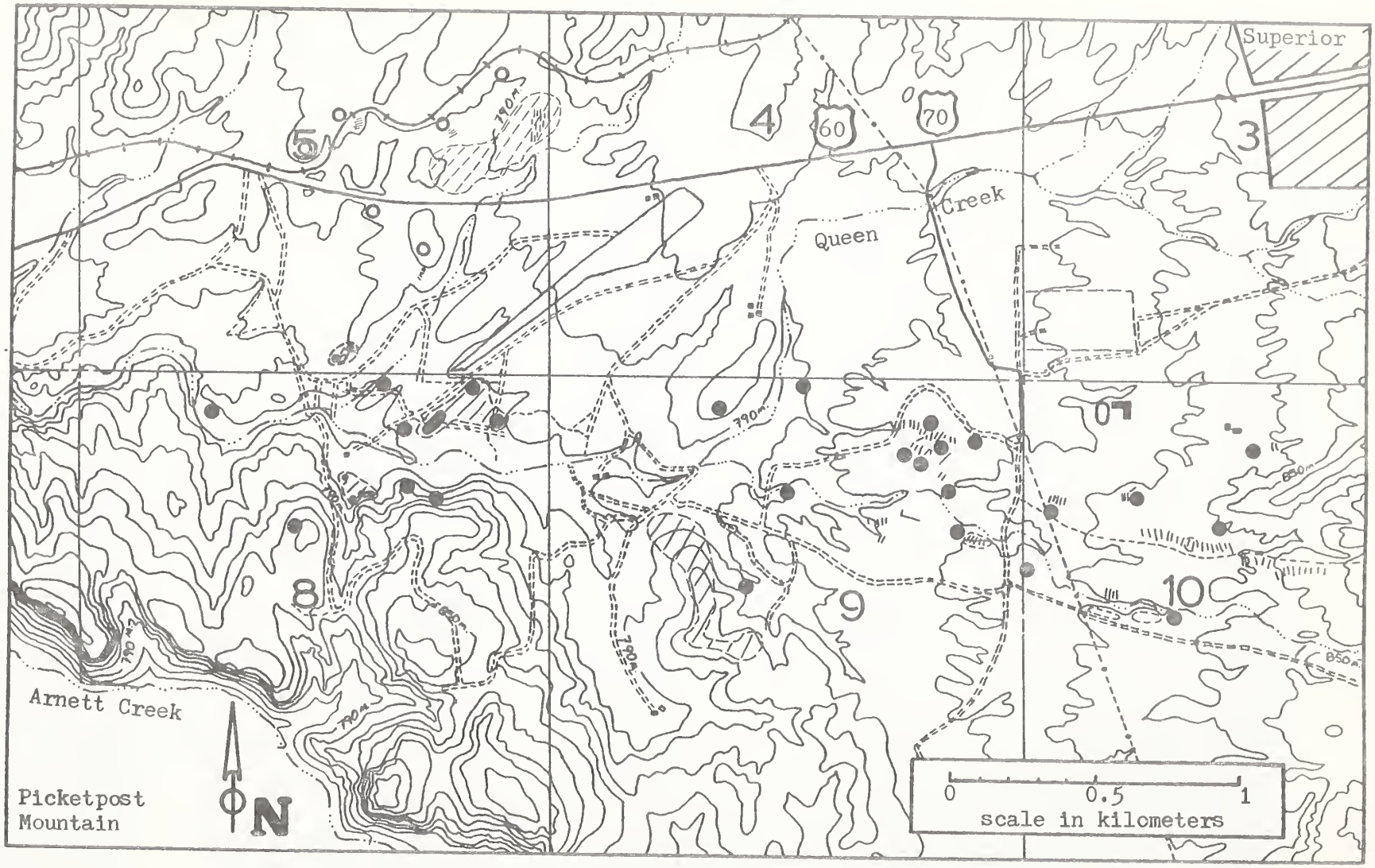

Fig. 5. Distribution of Archeological Sites and Agricultural Features

site location
agricultural field
check dams and terraces

status when recorded during the base survey, as they were seen as functional components of multi-behavioral loci identified as habitations. They were either treated as recognizable components of particular sites or as parts of a general, non-assigned behavioral system tied to particular groups of sites.

AR-03-12-91 was a one room boulder masonry semipit habitation structure with a large mescal roasting pit (historic Yavapai?) located nearby. A wing wall partially enclosing the room entrance probably supported a brush-walled outdoor work area.

AR-03-12-02-140 was a caliche slab walled structure, possibly a habitation.

Sites Located on Forest Land, Superior Base for Exchange

AR-03-12-02-93 was a small two room boulder masonry habitation-type structure with associated artifacts and agricultural features (Figs. 6 and 7). The artifacts included a variety of chipped stone material, mostly debitage and utilized flakes. There was a single sherd of Gila Red. The agricultural features were three cleared terraces and several small check dams. The term "cleared terrace" is used to denote an area of stream terrace or bench adjacent to an arroyo which received local runoff and which has been cleared of large rocks. These cleared terraces thus consist of an open sediment basin between the ridge slope and the arroyo bank, which was built up with the rubble from the field so as to retain runoff. This has served to retain field moisture and prevent the erosion of the arroyo bank. These features were characteristic of a widespread Hohokam agricultural technology (e.g. Canouts, 1975).

AR-03-12-02-94 was a small habitation-type site consisting of a single boulder room and several nearby check dams. It contained a number of chipped stone artifacts and ceramics of the types Gila Plain, Gila Red, Wingfield Plain, and Gila Polychrome (one sherd). It was also badly disrupted by historic ranching and mining activities.

AR-03-12-02-95 was a single room habitation-type structure associated with a number of checkdams on neaby runoff channels. Modern collection has totally disrupted the surface artifactual expression owing to its proximity to both a powerline and a well-traveled dirt road. There was also a large accumulation of modern trash in the area. But while surface artifactual remains consisted wholly of a few flakes and several sherds of Gila Red, the boulder structure appeared to be intact and was not at all disturbed by pothunting (Fig. 8).

AR-02-12-02-96 was another single room boulder masonry unit similar to 02-95, but associated with only a single nearby check dam. It evidenced a fairly high number of lithic artifacts and a small number of sherds, all Gila Plain or Wingfield Plain, both types essentially non-datable (see below). There was also a large amount of modern trash in the area, probably since it is close to a major road.

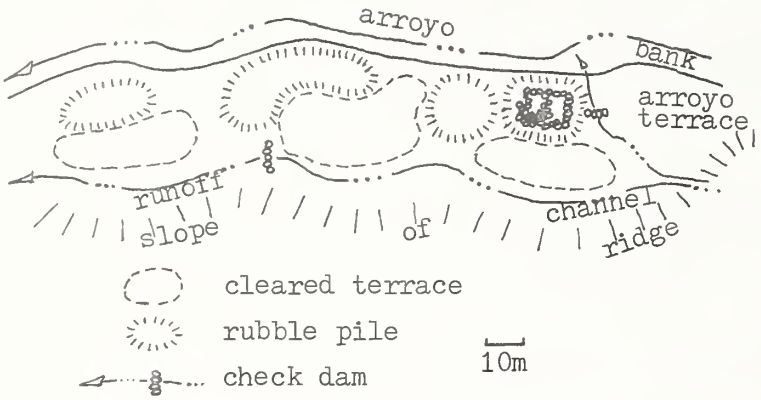

Fig. 6. AR-03-12-02-93

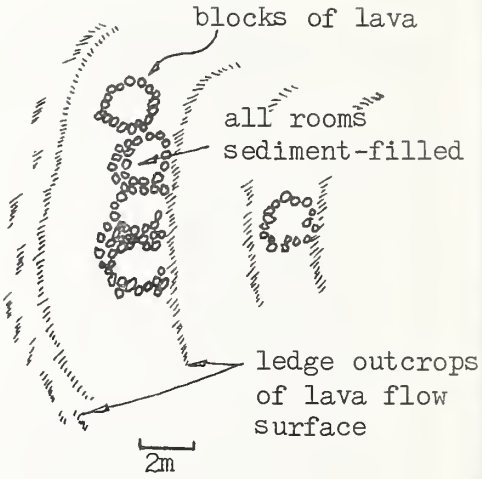

Fig. 9. AR-03-12-02-97

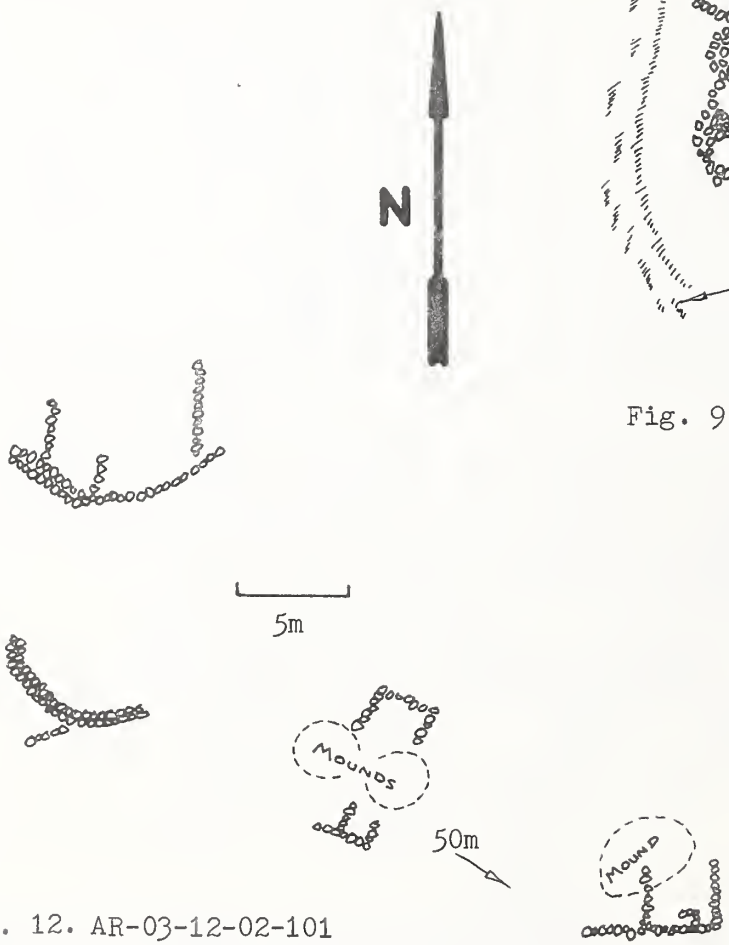

Fig. 12. AR-03-12-02-101

Fig. 7. AR-03-12-02-93 from the east, showing the cleared terraces.

Fig. 8. AR-03-12-02-95 from the southwest.

AR-03-12-02-97 was an intriguing site and is difficult to assess. Located on a high lava ridge above Queen Creek, it consisted of five small circular rooms built of loosely coursed angular blocks of the native rhyolite (Figs. 7, 9 and 10). The site was situated high on the crest of a little-eroded vent flow, well away from both water and sediment - as well as away from most of the useful vegetation in the area. There were a few small pockets of sediment on the otherwise bare rock surface, however. One such pocket, the largest on the upper ridge, occurred in a saddle just to the southwest of the site. The sediment there was very deep, retained moisture well, and supported a heavy growth of grasses and clover, but this same cover prevented observation of any artifacts.

There was an enormous amount of chipped stone material at the site, primarily of the native rhyolite and the chalcedony which occurs as nodules in the lava. There were a few sherds of Wingfield Red and a single quartzite mano a short distance south of the rooms. Indications are, then, that it was some type of habitation, though its function is unclear. Its location implies some special significance: scattered rhyolite lithics were found all over the surface of the lava flow, but this was the only architectural feature, it commanded a relatively wide field of view (that did not encompass any associated agricultural features), and it was the only site in the survey area without easy access to water.

This site is very similar to the "sleeping circle" site located within the arboretum. It also bears a remarkable resemblance to a site, AZ U:15:35 ASM, located in the low rocky hills northwest of Florence, Arizona, overlooking the Gila River (Doelle, 1976). The Gila River site has been interpreted as a periodically occupied defensive facility (a redoubt). If so, and this seems the most likely interpretation, hilltop circle structures such as those at 02-97 may represent an eastern variant of the Hohokam hilltop fort complex known from north, south, and west of Phoenix. However, since this identification is only tentative without some type of testing, and since it is difficult to relate this one small site to any kind of defense program for the size of population found along the creek, it will be considered only as a peculiar type of habitation site in the following analyses.

AR-03-12-02-98 was a small walled rockshelter in the sidewall of Queen Creek canyon west of the Pinal townsite. Built into a small ledge in the lava flow, its opening was circled by a crude wall or windbreak support of lava blocks (Fig. 11). There is a good deal of chipped stone material, including flakes and tools of rhyolite, chalcedony, and local basalt. There were also a few sherds of Salt Red and Wingfield Plain. Seemingly too small to have been a habitation, it may represent some special activity confined to the canyon. Several similar rockshelters were located further downstream (off-Forest) on the canyon walls.

AR-03-12-02-99 was a sherd scatter containing a number of Salt Red sherds with several of Gila Red, Wingfield Plain, and one sherd of Casa Grande

Fig. 10. AR-03-12-02-97 from the south-east; lower room cluster.

Fig. 11. AR-03-12-02-98 from the west.

Red-on-Buff, and early to middle Classic Period Hohokam ceramic. There were also several hammerstones in the vicinity and a fair amount of historic trash. The function of this site is not fully understood, but is discussed further below.

AR-03-12-02-100 was a collection of building remnants, consisting of portions of three walls built of native basalt blocks. This site represents something of a problem in that it was also associated with historic trash and there were historic petroglyphs on one of the basalt blocks. It appears that a prehistoric structure may have been reused by the residents of Pinal as a ready-made foundation for one of its many frame and plank houses. This situation is common within Pinal townsite (see below for additional examples). Prehistoric materials at the site, which overlooks the terraced former floodplain of Queen Creek, included a fair amount of chipped stone and pottery, specifically Gila Plain, Gila Red, a few sherds of Salt Red, one of Casa Grande Red-on-Buff, and small numbers of Wingfield Plain and what appeared to be Salado Red.

AR-03-12-02-101 was a multiple component habitation site on the low ridges overlooking the north bank of Queen Creek. It was made up of four separate units totalling at least 10 rooms (Fig. 12). These structures were represented by only a few remnants of boulder masonry walls, a number of hammerstones, mano and metate fragments, and a few hundred lithics and sherds. Pottery types at the site included Gila Plain, Gila Red, Wingfield Plain, a few sherds of Salt Red, and a few sherds of the highly micaceous variety of Gila Plain characteristic of pre-Classic sites of the middle and lower portions of Queen Creek drainage. There was also a lot of historic trash and several historic building foundations were located nearby. As a final note, it appears that the road which runs past the west edge of the site may have destroyed another habitation unit, as there is a large quantity of ground stone and sherds in the debris at the side of the road. The lack of large structural-size boulders and cobbles in this debris, on the other hand, may indicate that the cultural feature destroyed by the road was a trash mound or similar type of deposit.

AR-03-12-02-102 was another multiple component site involving two prehistoric boulder masonry rooms, two historic building foundations, a masonry-lined well and "root cellar," and an historic quarry in the top of a low tuff hull overlooking Queen Creek (Fig. 13). Prehistoric artifactual remains were quite plentiful - hammerstones, mano and metate fragments, chipped stone, and ceramics, including sherds of Gila Plain, Gila Red, and Wingfield Plain. There was also much in the way of historic trash - metal fragments, glass shards, broken china and stoneware, and bricks around the larger house foundation. While much of the prehistoric material was scattered closely around the prehistoric structures and on the ridgeslope northwest of the hill, there was a concentration of sherds and lithics around the smaller house foundation, possibly indicating that the house had been built over an earlier structure. The house foundations at the site were built of rectangularly cut soft tuff blocks from the quarry, as were many of the historic foundations identified in

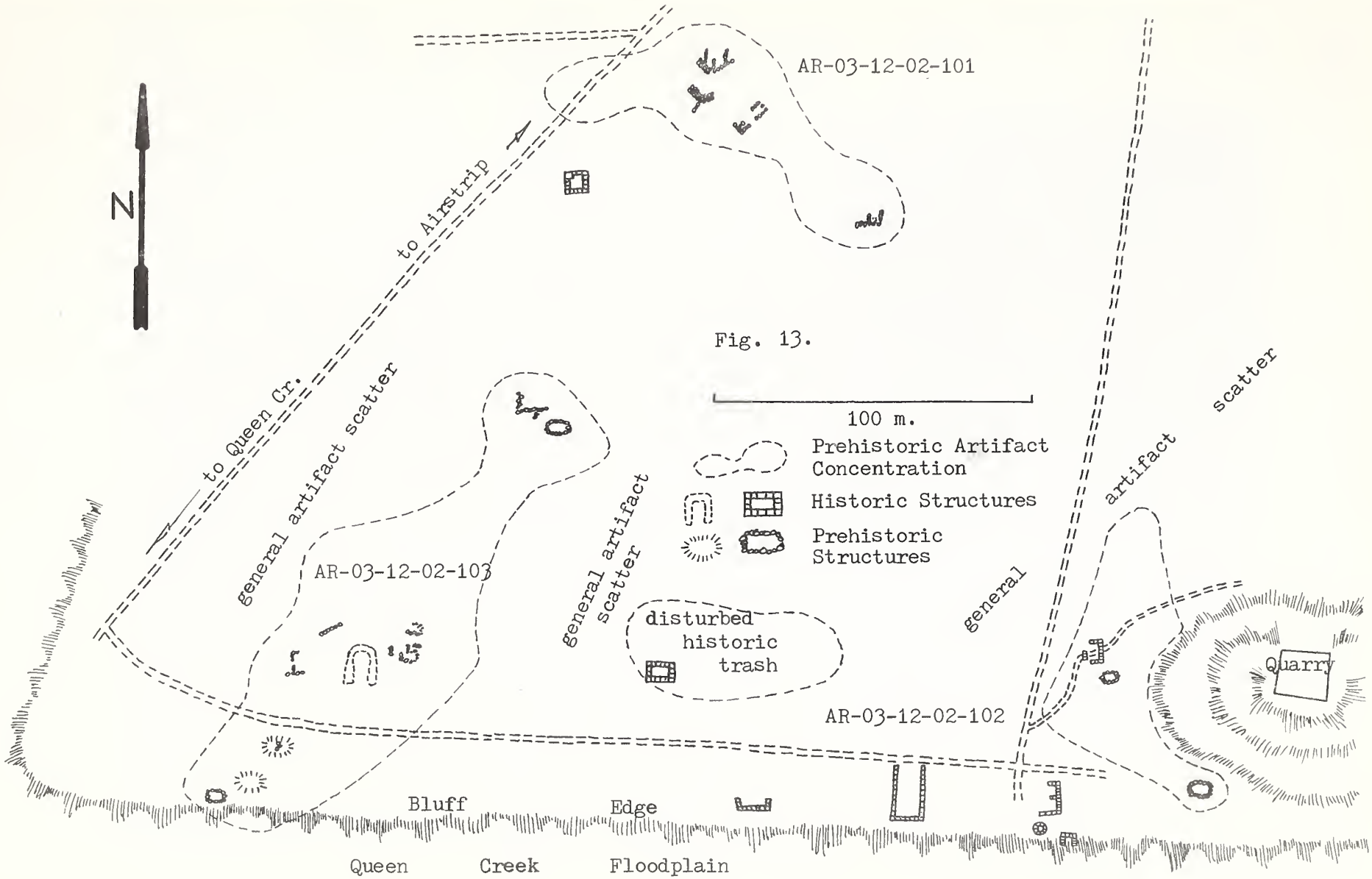
AR-03-12-02-101
N
to Airstrip
to Queen Cr.
general artifact scatter
AR-03-12-02-103
general artifact scatter
disturbed historic trash
general artifact scatter
AR-03-12-02-102
Quarry
100 m.
Prehistoric Artifact Concentration
Historic Structures
Prehistoric Structures
Bluff
Edge
Queen Creek Floodplain

Fig. 13.

the townsite (Fig. 14). This is in marked contrast to the use of stream boulders and cobbles or caliche slabs in the prehistoric structures.

AR-03-12-02-103 was also a multiple component group, making, with 02-101 and 02-102, a large "village" of at least twenty-five rooms (Figs. 10 and 13). This site and the other two just named appear to be remnants of a large prehistoric rancheria type village overlain by a portion of the town of Pinal. Artifactual remains around 02-103 are extremely dense, with many mano and metate fragments, several hundred hammerstones, several thousand sherds, and many thousand lithics. The range of pottery types was similar to that observed at 02-101: Gila Plain, Gila Plain Queen Creek variety, Wingfield Plain, Gila Red, a few sherds of Casa Grande and Sacaton Red-on-Buff, and one sherd of Gila Butte Red-on-Buff. Also on the site is what appears to be an historic house mound, around which were a number of historic artifacts and trash. Finally, one of the prehistoric rooms was excavated some time in the past, possibly even by residents of Pinal. It is now only partially re-filled (Fig. 20). The backfill from this room has itself recently been pothunted, and there is a considerable amount of pothunting disturbance of historic artifact areas adjacent to 02-103.

AR-03-12-02-104 was an enormous lithic scatter and raw material procurement area on the crest and slopes of a long ridge. Thousands of flakes, cores, choppers, and other chipped stone tools as well as an incredible amount of debitage litter the surface. The ridge is a breccia of tuff and cobbles of quartzite, rhyolite, chalcedony, and chert, all of which were used as raw materials for the manufacture of tools. The site apparently served as a lithic material source for most of the other sites in the base, as the majority of lithics at all base sites were of materials outcropping and being worked here.

AR-03-12-02-105 was a small historic camp, probably associated with the occupation of Pinal. It consists of a small "cabin" of dry-laid irregular tuff block walls with several adjacent piles of stone which may represent the remains of a storage structure and outhouse. Very little in the way of other artifactual material is present.

AR-03-12-02-106 was a large contiguous room pueblo-like structure, easily the largest single prehistoric structure in the area and one of the largest habitation loci. Its thirteen or more contiguous rooms and several enclosures of boulder masonry are laid out on a large artificial terrace built on the side of a low colluvial ridge (Fig. 16). This ridge is situated on the north side of Queen Creek in the bend where the stream changes course from south to west. Directly below to the east is a fairly dense mesquite bosque and to the south a broad, loamy stream terrace. The site has been heavily vandalized, though this activity seems to have taken place sometime in the past. There are numerous potholes in the enclosures, rounded depressions which mark excavated rooms, and many whole or partial walls that have been removed or disrupted. This disturbance has been extensive enough that, combined with problems of dense vegetation, the sketch map provided (Fig. 16) does little justice

Fig. 14. AR-03-12-02-102 from the east; the historic foundation.

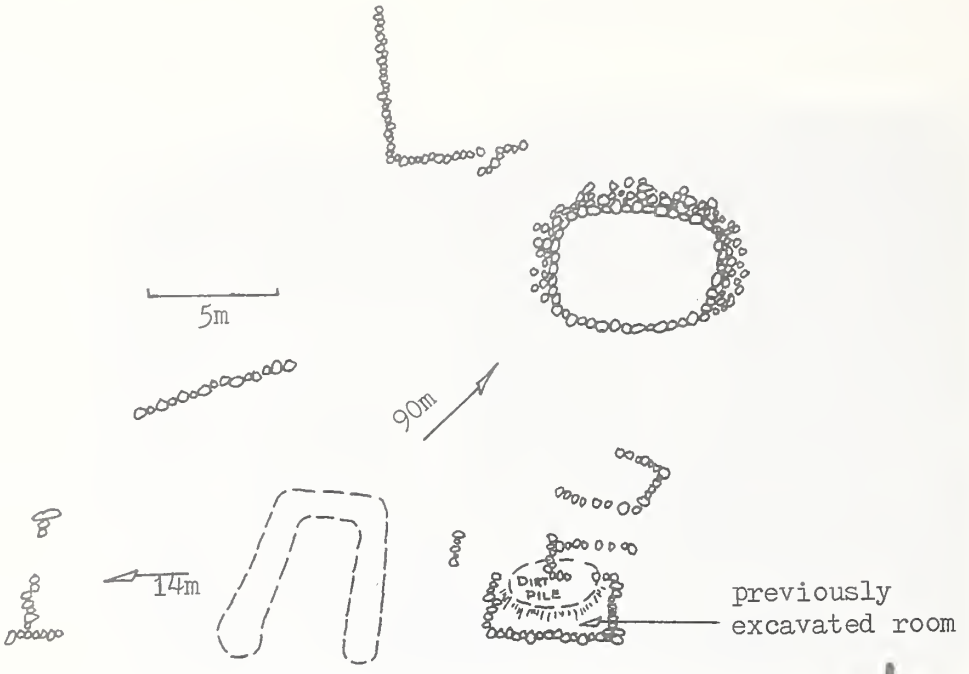

Fig. 15. AR-03-12-02-103

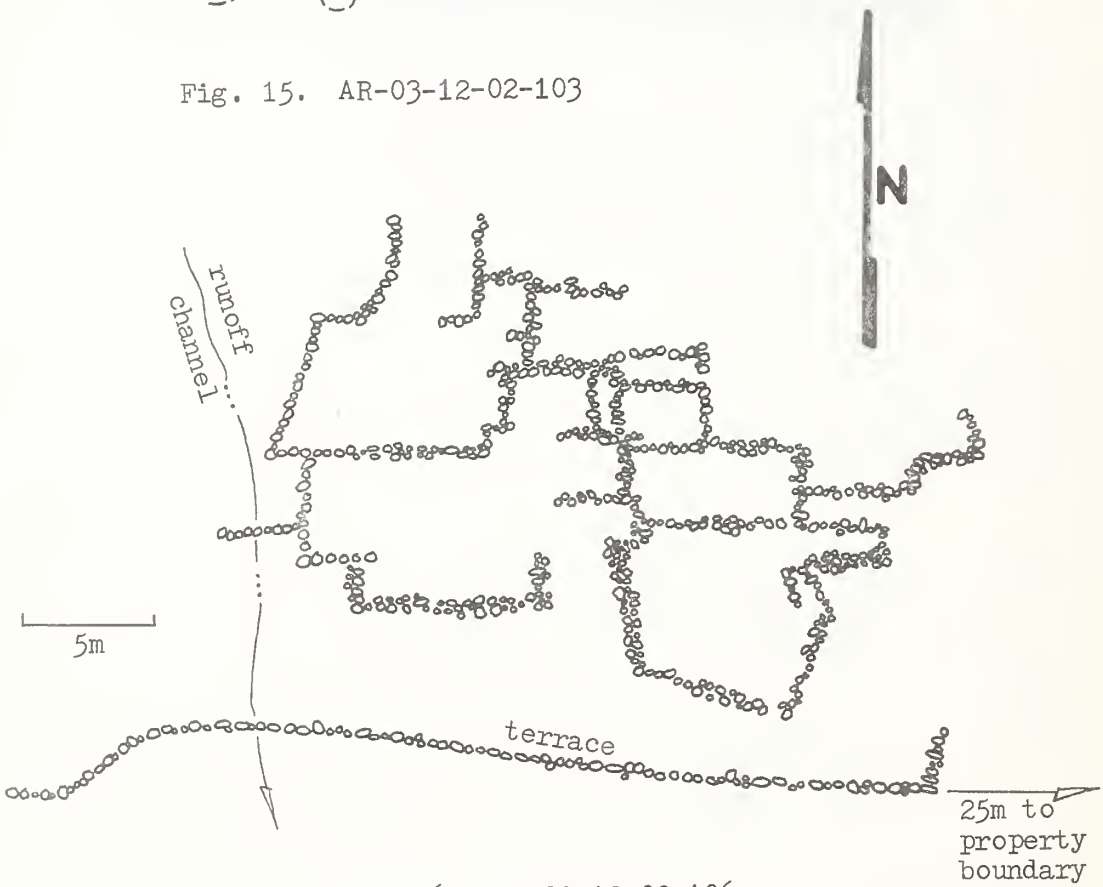

Fig. 16. AR-03-12-02-106

to the actual size and complexity of the site. There are still many thousands of surface lithics and hundreds of sherds and hammerstones present on the site. Pottery types observed were, again, Gila Plain, Gila Red, Wingfield Plain, and Wingfield Red. As many sherds were found in small piles placed on rocks, it is obvious that surface artifact distributions have been greatly affected by collection. The site lies at about the easternmost edge of Pinal townsite, evidenced by several historic house foundations located nearby. This situation has provided at least a decade of potential intensive impact, followed by almost 90 years of both casual and systematic pothunting.

AR-03-12-02-107 was a smaller multi-room site on the edge of the colluvial fan, overlooking Queen Creek and opposite the ridge containing 02-106 (Fig. 17). It has six or more rooms of boulder masonry, some or all of which may be at least partially contiguous. Though several recent potholes were evident, there has been less disruption at this site than at those to the west, on the north bank of the creek and within the confines of later Pinal. As a result, surface artifactual remains are abundant, including lithics, groundstone, and sherds. Pottery types observed are predominately Gila Plain and Gila Red, with some Wingfield Plain. There were also several sherds of Tonto Plain and one or two of Gila Polychrome.

AR-03-12-02-108 was a single room habitation-type structure with a large pothole in the center and a single sherd of Wingfield Plain.

AR-03-12-02-109 was another single room prehistoric habitation type structure in the desert section of the base (Fig. 18). Situated on the edge of a deep arroyo, the site also involves an elaborate agricultural construction. A field at the arroyo's edge was cleared of surface rocks, which were piled up along the edge of the bank, as at 02-93. Within this field were built seven boulder and cobble terraces, each between 5 and 7 meters wide. The retaining walls for the terraces were between 10 and 20 cm. high and held a fine textured sandy loam fill. Artifactual remains at the habitation structure included a large number of lithics, including several well-finished tools, hammerstones, several mano and metate fragments, and an appreciable number of sherds. Pottery types were predominately Gila Plain and Gila Red with some Wingfield Plain. There were also several sherds each of Gila Polychrome and Pinedale Polychrome, a White Mountain Redware. The site has apparently never been collected or vandalized.

AR-03-12-02-110 was a complex site involving at least two distinct temporal components and three closely proximate spatial loci, each involving cave dwellings originally occupied prehistorically and later reoccupied, presumably by residents of Pinal. The first locus involved two lava block walled rooms built in and around a hollow beneath a very large block of lava talus fallen from the cliffs overhead (Fig. 19). Both the front and rear of the overhang were walled off. The wall at the back of the larger room was straightened up by the historic occupants, who reworked the contours of the stone with a hammer and chisel. The second

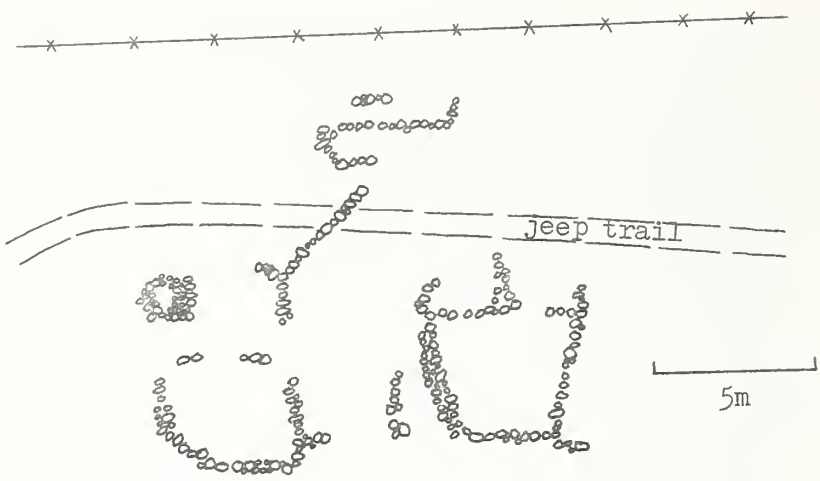

Fig. 17. AR-03-12-02-107

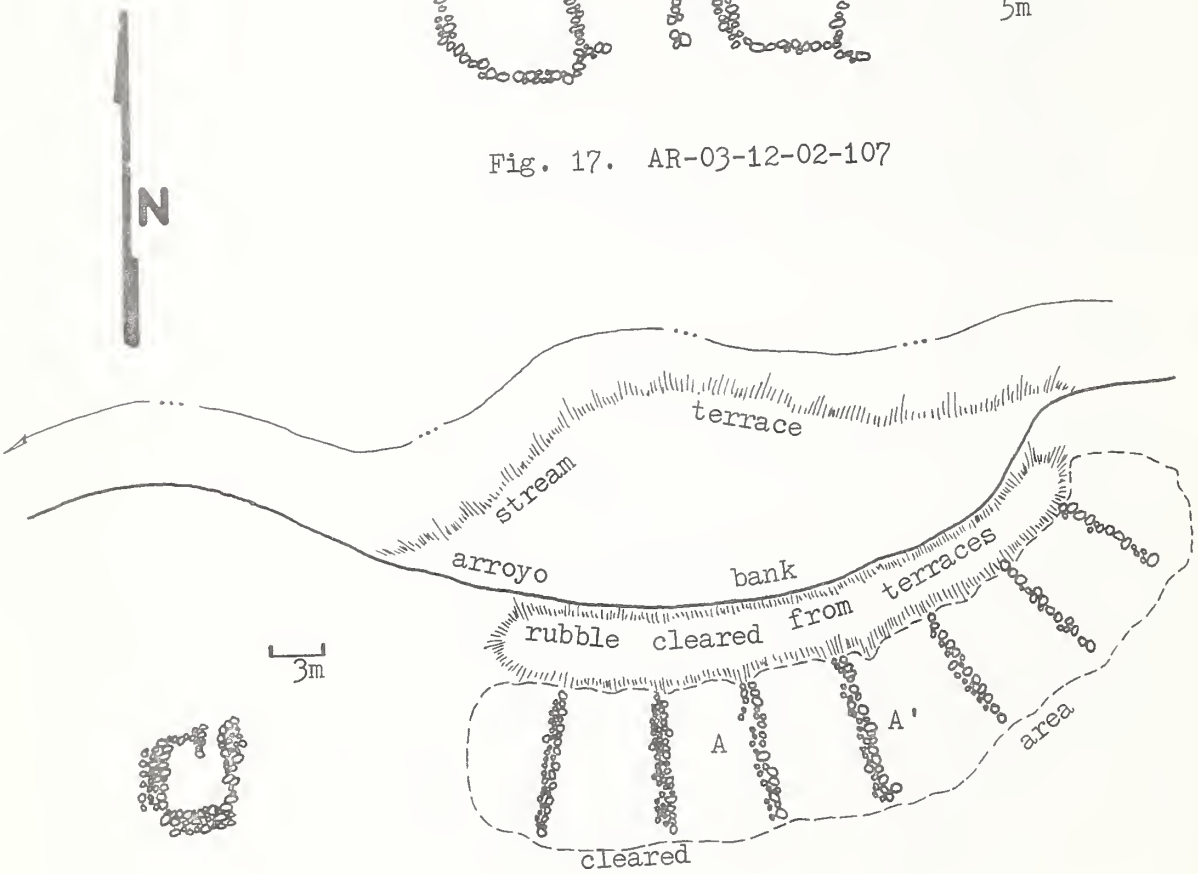

Fig. 18. AR-03-12-02-109

cross section A - A'
terrace height range
10 - 20 cm.

Fig. 19. AR-03-12-02-110 from the south; the talus block rooms.

Fig. 20. AR-03-12-02-110 from the northwest; walled cliff shelter.

locus was a rock shelter in a natural overhang of the cliff. The rhyolite lava overlays a thick layer of soft tuff which has eroded out a number of hollows suitable for occupation along the cliff line at the top of the talus. The shelter at this locus was also walled off with lava blocks (Fig. 20). Cut nails hammered into the tuff walls of the cliff face attest to the historic use of the shelter, as does other period trash. Below the cliff face room, another room of tuff blocks was built on the talus. This room was associated primarily with prehistoric materials. The third locus was probably the most distinctive. Moving east from the first cliff shelter, there are a number of bedrock motars ground into locally harder places in the tuff shelves along the floor of the shelter. Further along the cliff face, some 20 meters from the first locus, following a line of a dozen bedrock metates, is a larger shelter. On a shelf at the west end of the shelter is a single (intact) room of tuff blocks set in adobe mortar (Fig. 21). The room is evidently historic, as it incorporates steel-cut juniper lintels in a large doorway, a small side window, and a board-framed rectangular window placed over the door. This last feature was fairly common in Arizona domestic architecture of the last quarter of the 19th century (Sherman and Sherman, 1969). There is also a "fireplace" of sorts built up of masonry in the room. Outside there is a heavy accumulation of historic trash, and a bedrock metate in the doorway. Prehistoric artifactual materials at this and the other loci included a number of lithics, groundstone tools and fragments, several of which were metate fragments of black, vesicular basalt, and a few sherds of Wingfield or Queen Creek Plain. All the prehistoric material was mixed with later historic trash. In addition to these loci, there may be another further east along the cliff face. It was a small alcove filled with jumbled rock and what may have been remnants of a wall. There were no artifactual remains, however. AR-03-12-02-111 was another rockshelter site in two more or less continuous overhangs in the tuff band below the lava flow (Fig. 22). Long and shallow, these shelters contained deep ashy middens and a multitude of artifacts. They were also heavily vandalized. There were makeshift screens and even an old steel lawn chair left on the site, in among the many potholes. In backdirt from the potholes were abundant lithics, groundstone fragments, including mano and metate fragments of black vesicular basalt, and sherds of Gila Plain, Gila Red, Wingfield Plain. However, there was also some Tonto Plain, a fair amount of Queen Creek plainware, and one or two sherds of Casa Grande Red-on-Buff.

AR-02-12-02-112 was still another rockshelter site in a deep overhang with large fallen lava blocks enclosing the east end. This shelter was essentially similar to those at 02-111, with more or less the same range of artifactual materials in an even deeper ash midden, more than 1 meter deep. If anything, this site has been even more badly vandalized. Typical of all the cliff shelter sites, it had a variety of bedrock grinding features. Just a few meters to the east of the shelter was an historic campsite - fire circle, trash, and an old wooden bench in a sheltered alcove under a large hackberry tree.

Fig. 21. AR-03-12-02-110 from the north-east; the historic "cliff dwelling."

Fig. 22. AR-03-12-02-111 from the east; showing the extent of vandalism.

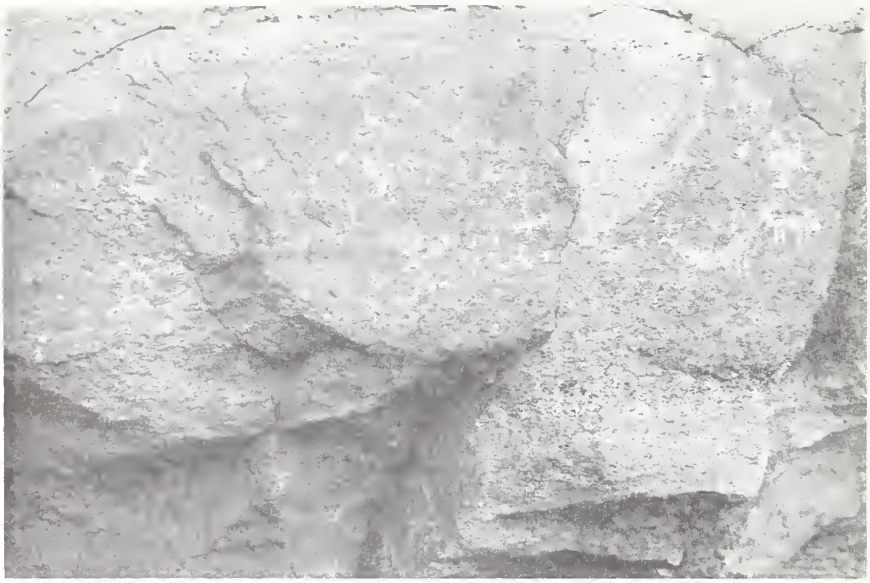

Fig. 23. AR-03-12-02-112 from the south; petroglyphs on the cliff face.

Fig. 24. AR-03-12-02-112 from the south; pictographs on the cave wall.

Despite the rampant vandalism at the site, two remarkable features have survived. At the eastern end of the site, on the tuff face of the cliff, there is a panel of petroglyphs pecked into the rock's very thin patina (Fig. 23). The panel was located above the shelter and could be reached only by way of a large talus block, the surface of which contained a number of bedrock mortars. Below the petroglyphs, at the back of the shelter, were a number of paintings done on the tuff in black carbon paint (Fig. 24). The petroglyphs appeared to be mostly standard forms - men, bighorn sheep, etc. - but the paintings are not. The only recognizable form was that of a quadruped (rabbit?). Other sections of the back wall of the shelter may also have been painted, but few remnants of images remain visible. Comparison with other petroglyph localities, such as those at Painted Rocks Reservoir (Wasley and Johnson, 1965) or along the Lower Salt and Verde Rivers (Canouts, 1975; Snyder, 1966), indicates that the figures seen at the Pinal sites are part of the Hohokam tradition.

AR-03-02-113 was the site of Pinal. The history of this important if briefly occupied milling town has already been outlined above. Nothing remains above ground today, all of it having been removed as construction materials for the building of Superior or carried off by relic hunters. Of the 123 buildings recorded for the town, just over forty small building foundations or mounds were located during this survey (Figs. 25-28). Among these was that of the original mill (Figs. 29 and 30). There were also a number of large platform foundations at the edge of the terrace and several rock walls on the lava ridges in and around the townsite. These walls reportedly served in historic times as stock fences. Subsequent survey in the area has identified a portion of the original Pinal-Silver King Road, running north from Pinal towards Silver King Wash. Finally, a small cemetery, associated by headstone dates of 1880 and 1881 with Pinal, was located approximately a kilo-meter north of the townsite, not far from the old road (Wood, 1976b).

Summary of Sites from Base Survey

The 21 sites recorded for this portion of the base fall into two arbitrary classes: habitation and limited activity. The habitation sites were identified as such on the basis of structural remains and were of six types: 1) rock shelters; 2) small architectural, 1-2 rooms; 3) medium architectural, 3-6 rooms; 4) large dispersed architectural, 7 or more rooms in separate small or medium sized blocks; 5) large concentrated architectural, 7 or more rooms; and 6) historic. This last type tends to overlap in some cases with other types. Limited activity sites were identified as such by a lack of structural remains and distinguished on the basis of artifact content. They consisted of only two types: 7) mixed (lithic and ceramic) artifact scatter; and 8) lithic scatter/probable lithic raw material procurement and preparation. A compilation of these classifications is presented in Tables 1 and 2.

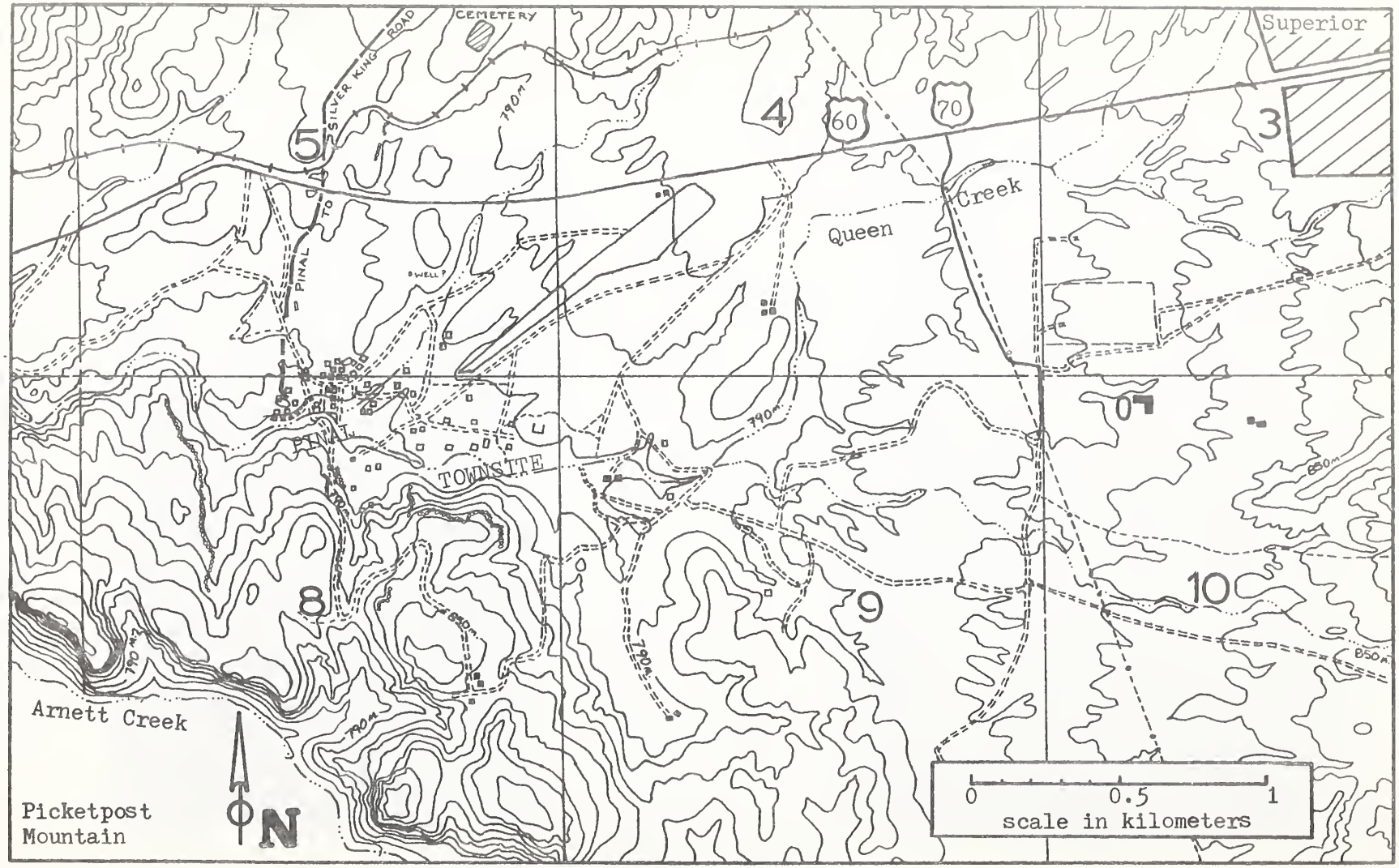

Fig. 25. Location and Distribution of Identified Structures, Pinal Townsite

- building foundations and house mounds
- quarry
- rock wall

Fig. 26. AR-03-12-02-113 - Pinal, view south; housemounds in foreground.

Fig. 27. AR-03-12-02-113 - Pinal, view SE; part of mill complex in foreground.

Fig. 28. AR-03-12-02-113 - Pinal, view SW; part of mill complex in foreground.

Fig. 29. AR-03-12-02-113 - Pinal, view south; foundation in mill complex.

Fig. 30. AR-03-12-02-113 - Pinal, view west; mill complex foundations and Queen Creek canyon.

Table 1. Classification of Base Sites by Class and Type*

Habitation Sites	no. of rooms or equivalent
1) AR-03-12-02-98	1
-110	4
-111	2
-112	1
2) AR-03-12-02-93	2
-94	1
-95	1
-96	1
-100	2
-102	2
-108	1
-109	1
3) AR-03-12-02-97	5
-107	6
4) AR-03-12-02-101	12
-103	12
5) AR-03-12-02-106	13
6) Ar-03-12-02-105	1
-113	40+
Limited Activity Sites	
7) AR-03-12-02-99	N/A
8) AR-03-12-02-104	N/A

Table 2. Frequencies of Site Types from Base Survey*

Habitation	no. of sites	% of class	% overall
1)	4	21.1	19.0
2)	8	42.1	38.1
3)	2	10.5	9.5
4)	2	10.5	9.5
5)	1	5.3	4.8
6)	2	10.5	9.5
subtotal	19	100.0	90.4
Limited Activity			
7)	1	50.0	4.8
8)	1	50.0	4,8
subtotal	2	100.0	9.6
total	21		100.0

*excluding sites excavated prior to base survey;
these sites will be treated in general discussion.

Sites Located Outside Forest Boundaries, Superior Base for Exchange Survey

AZ U:12:8 ASU was a complex site made up primarily of agricultural features. The first of its three loci was a large sherd and lithic scatter, the second was a very large system of check dams and other runoff control devices. There were approximately 90 of these boulder-constructed features along runoff channels in the area. The third locus was a small system of four terraces on the slope of a low ridge. Ceramic types for all loci were Gila Plain, Gila Red, Wingfield Plain, and Gila Polychrome, represented by one or two sherds at the first locus.

AZ U:12:11 ASU was a site made up of two room blocks built on the tops of two low basalt hills overlooking Pinal townsite. They were constructed of native grey basalt blocks and the artifactual materials associated with them were especially heavy in the low saddle between the room blocks. Pottery types observed at the site included Salt Red, Tonto Plain, and Salado Red. The southern room block appears to have been used as an historic house foundation, as indicated by trash remains and by evident repositioning of some of the masonry to conform to the regular square outline of the house (see below).

Site Density

Excluding the historic sites (2) and the non-structural, non-habitation sites 2 from the inventory, there was a total of 21 sites in the 3.6 square kilometers of the base. Prehistoric habitation density was thus 5.8 sites per square kilometer. Total prehistoric site density (25 sites) was 7.2 per square kilometer. While common to survey reports, such values are of questionable utility. Until the significance of and relationships between special activity sites, habitation sites, and other types of sites are known, the figures are largely meaningless. As well, cultural areas containing several loci recorded as a single site require a detailed temporal characterization before it can be stated positively that the several loci were actually contemporaneously related and thus classifiable as the same site or that temporal (or other) differences between loci indicate different sites overlapping in space. This type of information is only rarely available from survey data and is seldom possible for surveys done at an inventory level. Because of this, it is felt that a more realistic descriptive measure than site density needs to be developed. One that would be more in keeping with other resource descriptions would be a characterization in terms of the percentage of any given surface area exibiting cultural material and contained within the boundaries of sites (or types of sites). Unfortunately, the heavy reuse of the Pinal area makes such estimates suspect, at least for the townsite area. Therefore, numeric density values are presented here in order to provide a rough estimate of the intensity of cultural expression in the base area. In comparison to other parts of the Tonto National Forest, this would be considered a moderate site density.

Historic population density in the base is a matter of (often conflicting) record and was discussed above. All that the survey has added in this regard is the confirmation of the presence of at least 43 historically built or used structures in the townsite.

Architecture

As has been stated elsewhere in this volume, adaptation is the major problem other than cultural relationships that needs to be addressed for the upland desert archeological assemblage. Architecture is one means to this end, as architectural forms, in this case habitation and agricultural structures, are attempts to adapt to both physical and social environments. As social adaptations, architectural forms influence and reflect the relationships of the social units occupying them. The variety in the form within the environmental setting of the prehistoric and historic structures described here would provide an important source of information on these relationships, making this area an excellent field for further study along these lines.

Prehistoric Patterns

Prehistoric construction in the base was typcially of a type called boulder masonry. This technique entailed the use of unmodified river and colluvial boulders, cobbles, and sometimes caliche or other slabs, set either coursed or uncoursed in abundant adobe mortar (Figs. 31 and 32). Where available on site, basalt blocks were also used. These masonry structures were commonly less than a meter high, apparently serving to provide a foundation for a perishable superstructure of adobe or jacal. The use of upright slabs as a first course around the inside base of room walls was another common feature of the technique, and is found throughout the central Arizona desert uplands and occasionally throughout the rest of the Southwest. As a final comment on the technique, the excavations carried out at two of the base sites 02-88 and 02-91 indicated that these structures were not simply built on the desert surface, but were constructed around the insides of shallow pits dug into sterile subsoil. Outdoor work areas enclosed within rock-supported brush walls or windbreaks were constructed directly on the existing surface. In use these areas must have had the appearance of Pima "Brush Kitchens".

Layout of individual rooms observed in the base ranged from roughly square, as at 02-88, to irregularly rectangular with distinctly rounded corners, as at 02-91. The most common form was rectangular with median room size something on the order of 3 meters by 5 meters, though the range in wall lengths was from 2 meters to over 6 meters. Rooms occurred variously as isolated single structures, single rooms in groups, small room blocks made up from two to four contiguous rooms, or, in the case of 02-106, as a multi-room contiguous structure with attached walled enclosures. Conspicuously absent from this assemblage, however, as from all but the lower reaches of Queen Creek drainage, were the characteristic compound villages and platform mounds of the Salt-Gila Basin Soho Phase and the Tonto Basin Roosevelt Phase.

Fig. 31. AR-03-12-02-103; construction detail from excavated room.

Fig. 32. AR-03-12-02-91 after excavation; construction detail.

As was discussed above, the architectural forms seen at Superior are found everywhere in the northern and northeastern margins and peripheries of the Sonoran desert and have been assigned to three archeological assemblages - Classic Period Hohokam, Salado, and Southern Sinagua. That the architectural traditions of three supposedly distinct assemblages are nearly identical, differing for the most part only in available materials, must indicate that either the architectural tradition was somehow historically common to them all or that all three assemblages were part of a single behavioral tradition. Probably the explanation must involve elements of both views.

Historic

The house and other building foundation remnants observed in Pinal townsite were in contrast to the prehistoric patterns, almost always strictly square and rectangular in layout with straight walls and 90° corners. Most were constructed of square-dressed tuff blocks apparently quarried from the low outcrop hill in the eastern part of the town (Fig. 13 and 25). These blocks were laid up in cement or sand-adobe mortar to form low foundations for more perishable superstructures, a practice very similar to that exhibited prehistorically (Figs. 33 and 34). Cut and wire nails, bricks, and burned adobe fragments associated with these foundations indicate that the most common superstructures were of wood, brick, or adobe construction, though some structures, as seen in photographs of the town (Woody and Schwartz, 1977), were built entirely of cut stone masonry. There were also fragments of roofing materials at several locations, including two of the reoccupied rockshelters, indicating some "tar paper shack" construction as well. Most photographs of Pinal (Sherman and Sherman, 1969; Wilson, 1976) confirm these observations. Other patterns observed less frequently at the townsite included dry laid masonry and adobe construction without foundations, rock-shelter architecture involving dry laid and mortared masonry, and the use of concrete slab foundations. Finally, if Pinal was anything like other such towns of the period, the use of wood-framed canvas covered "tent house" construction, with and without foundations, should be expected, identifiable by the presence of nails and brass canvas grommets.

The old Pinal - Silver King road showed two distinct modes of construction approaching Pinal. The half kilometer section south of Highway 60 was excavated deeply into the tuff substrate, in some places as much as 50 cm. deep. In many places this excavation was further deepened by wagon wheel ruts worn into the soft bedrock. The final approach to the mill site was built up on an earth filled grade, bounded in places by rough masonry retaining walls.

Historic Reoccupation

The similarity in some construction practices and the reoccupation of some sites and features seen in Pinal has produced some blurring of the prehistoric patterns in the townsite. The rockshelters were modified somewhat by the addition of masonry enclosing walls and other features.

Fig. 33. AR-03-12-02-113 - Final; foundation detail.

Fig. 34. AR-03-12-02-113 - Final; foundation detail.

Fig. 35.

AR-03-12-02-113 - Pinal, view south toward the townsite along the bedrock-rutted portion of the Silver King to Pinal ore wagon road.

Fig. 36. AR-03-12-02-113 Pinal, view north along the historic wagon road.

At other sites there were other, sometimes more complex effects. At 02-100 there was a strong overlay of historic trash and a rough wall (?) of basalt blocks which was associated only with historic materials. At 02-102 a dressed tuff foundation lies near one prehistoric room and may lie over another, as evidenced by large quantities of prehistoric materials coming out of rodent holes exiting from beneath it. Most confusing, perhaps, was the situation at AZ U:12:11 ASU, where, judging from the features of historic construction and artifactual materials, one of the prehistoric basalt block structures was partially rebuilt and used as a foundation for a wood framed house. This house, in fact, appears in a photograph of the town (Sherman and Sherman, 1969). Other historic structures recorded by this survey probably mask still more prehistoric features, especially considering the depth of historic material in the "downtown" section of Pinal.

Historic reoccupation of prehistoric sites was not uncommon in the Southwest. It has always been a widely acknowledged practice and is still going on today. The early Mormon settlers of the Colorado Plateau seem even to have specifically sought out Indian ruins as indicators of desirable townsites (Powell, 1961). It is not necessary to look any further for an additional example than the cities of Phoenix, Tempe, and Mesa, Arizona, less than 80 km. away. These three cities and their surrounding agricultural developments were built on top of what may have been as many as thirty large Classic Period Hohokam villages, towns, and cities, as well as countless earlier and smaller sites. They also utilized much of the prehistoric irrigation system (Turney, 1929). Only a few small remnants of the prehistoric occupation are still recognizable under the massive amounts of ground levelling, construction, concrete, and asphalt that combined to produce the Phoenix metropolis. This in mind, Pinal townsite represents something of a unique situation in the Southwest in that both the historic and prehistoric occupations of the area have been reduced to foundations of similar size and scale and both have undergone similar amounts and types of vandalism. As such it offers a significant data base from which to study both the phenomenon of reoccupation and comparative environmental adaptations used by two distinctly different populations.

Artifact Descriptions

Introduction

No collections of artifactual materials were made in conjunction with this survey, for reasons outlined above. Therefore, some description of the way in which the following determinations were made is in order.

To begin with, the estimation of the range of types involved is a direct function of the survey procedure. Upon locating a site, a thorough hands and knees search of the areas in and immediately around any structures was made, noting classes and types of artifacts observed as well as raw materials in the case of stone tools and debitage. After this was accomplished, the area between and around structures was walked to turn up any

further types of material. In the case of sites with no architecture or obvious habitation area (as with rockshelters) the denser portions were closely observed and the margins walked to determine their extent and inventory.

Since raw material and pottery type designations were made on the basis of experienced recognition following detailed analysis done during the excavation of 02-88 and 02-91, rather than by laboratory analysis of survey collections, they can here be regarded only as approximations.

Having made no collections, there can be no real quantification of artifact data from the survey. Therefore, only brief discussions of the types of ceramics observed and the raw materials utilized in chipped and ground stone tool manufacture are presented. These are probably the most important assemblage characteristics for cultural association analysis and for dating at the level of data recovery involved. They are dealt with as overall values as well as on a site by site basis. The small size of the area and the apparent contemporaneity of the sites makes this practical.

Ceramics

The pottery types represented in the Superior area are predominately related to the Classic Period of the Hohokam tradition (Smith, 1976), an assemblage dominated by plain and red wares. There were also several types usually associated with what is called the Salado assemblage.

The primary Hohokam tradition ceramics found at Superior included Gila Plain, the single most common type in the area; Wingfield Plain, next most common, with its associated types Wingfield Red and Brown; and Gila Red. Gila Plain is usually a light grey-brown to reddish pottery, usually unslipped but often smoothed on the outside, occasionally showing a few haphazard tool polishing marks. It was made by the paddle and anvil technique and tempered with a variety of materials. Both of the two major varieties of the type were found on the base - the quartz sand tempered Salt variety and the mica schist tempered Gila variety. Of the two, the Gila variety was much more common in this area. In addition, the fine mica tempered Queen Creek variety was found at the rock shelter sites and a few of the other creekside sites. This variety of Gila Plain was manufactured locally on Queen Creek and constituted a major part of the pre-Classic plainware inventory there, though it had apparently ceased manufacture by the time of the Classic Period. It has so far been limited in reported occurrence to the Queen Creek drainage, though sherds previously identified at Pueblo Grande as Vahki Plain (Wood, Ward, and Gasser, 1975) may actually have been of this type and variety. It may also have been identified in small amounts on the nearby middle Gila River (Debowski, et al., 1976), though poor description of that material makes this identification less clear. Gila Red is similar in manufacture to Gila Plain and it too is commonly coarsely tempered with quartz sand and mica, though in this area it sometimes occurs with schist or phyllite temper; the old type "Higley Red", no longer used. Both interior and

exterior surfaces are usually polished, at least on bowls, with distinct parallel and sometimes patterned striations. Bowl interiors were often smudged black and fire clouds are common on the red exteriors. It, like Gila Plain, was a widespread and variable pottery (Haury, 1945; McGregor, 1965; Wood, Ward, and Gasser, 1975). It eventually graded into the type Salt Red, a few sherds of which were found at several sites on the base. This successor to Gila Red had more even and overall polishing, without striations. It was also more orange in color than the dark Gila Red and had a finer, more homogenous paste and temper which did not usually contain much mica (Haury, 1945).

The other group of Hohokam plainwares found at Superior was the Wingfield series. It is a group of pottery types - plain (unslipped), brown (slipped), and red (slipped) all tempered with phyllite or large platy fragments of schist. It is found all over central and southern Arizona through nearly the entire history of pottery making there (Weaver, 1974). It occurs most frequently at the margins of the lower Sonoran desert, the heaviest concentrations being to the north and west of Phoenix, where there are extensive exposures of phyllite. There is another large outcrop about 10 km. west of the Superior base. Wingfield ceramics are considered to have been a Hohokam phenomenon owing to their having formed the bulk of the pottery assemblage in a number of distinctly Hohokam contexts. They are known to have made up approximately 25% of the ceramic assemblage at the Classic Period Hohokam site of Pueblo Grande, at least in the Soho Phase (Wood, Ward, and Gasser, 1975). Wingfield Plain, Brown, and, later, Red were the typical ceramics of the Hohokam assemblages of the lower Verde River, Cave Creek and Agua Fria drainages (Canouts, 1975; Gumerman, Weed, and Hanson, 1976; Rodgers, 1974; Ward, 1975; Weaver, 1974; Weed and Ward, 1970). Colton (Colton and Hargrave, 1937) originally classified Wingfield as a Hohokam pottery, though he later reclassified it (Colton, 1941) and finally (Colton, 1958) just ignored it. Long considered confusing and problematical, a considerable amount of recent research has demonstrated once again that Wingfield ceramics were a Hohokam manufacture.

In addition to the plainware/redware assemblage, a few sherds of the Hohokam Red-on-Buff series were observed in several Superior contexts. These included a few sherds of Sacaton Red-on-Buff, a somewhat larger amount of Casa Grande Red-on-Buff, and a single observed sherd of Gila Butte Red-on-Buff, a type much earlier than the rest of the cultural materials near Superior. The Sacaton and Casa Grande Red-on-Buff sherds seemed more or less contemporaneous with the rest of the occupation, Casa Grande Red-on-Buff being characteristic of the early Classic Period. The single sherd of Gila Butte Red-on-Buff was found in association with a masonry structure at 02-103. No explanation of this occurrence will be attempted here. It was, after all, only one sherd, and pre-Classic Hohokam sites are found only a few miles downstream in the broad valley of middle Queen Creek.

The "Salado" ceramic type Tonto Plain (also known as Tonto Brown or Verde/Tonto Brown) found at Superior was typical of the Tonto Basin area

to the northeast. It was very similar to Gila Plain (Salt variety), having a coarse paste and quartz sand with other inclusions for temper. It was often smoothed, sometimes lightly polished in a manner similar to Gila Red. As with the lower desert types, it was manufactured by the paddle and anvil technique. Along with Tonto Plain a few sherds of Salado Red were encountered at Superior. This type is a purplish red obliterated corrugated (Steen, 1962).

The last three important pottery types found during the survey were Gila Polychrome, Pinedale Polychrome, and Fourmile Polychrome. Gila Polychrome is a problematical type which enjoyed a wide distribution and manufacture. The specimens observed here were made on what were, for all intents and purposes, Gila Red bowls and the interiors were usually polished, slipped white, and decorated with carbon black paint (McAllister, 1977). Once considered the calling card of the Salado (e.g., Gladwin, 1935; Steen et all, 1962; McGregor, 1965), the position of this type is now open to question. In the Salt River Valley, for instance, much of it appears to have been made locally from Gila and Salt Red (Pueblo Grande Museum collection).

Pinedale Polychrome is a more established type, easier to deal with. It was a well-finished, orange slipped type with designs painted in white and black. The black paint was the earliest glaze used in the Southwest. Paste is grey and tempered with ground potsherds (McGregor, 1965). Its origin relative to Superior may have been in the Canyon Creek area north of the Salt River and east of Tonto Basin (Steen, et al. 1962), though it was not indigenous to that area. Here it was, with Fourmile Polychrome, a similar type, the most common painted ceramic (Haury, 1934). There were also several sherds of Pinedale Black-on-Red found at 02-91, though they may actually have been fragments of Polychrome without any white paint showing. Several sherds of Fourmile Polychrome were recovered from the excavation of 02-88.

A characterization of the ceramic inventory of the survey is presented in Table 3. Any further description would require a collection and more detailed analysis.

Chronology

Since no artifact collection was made during the survey, there has been no opportunity to place the sites identified in a relative temporal sequence, as might have been possible using pottery type frequency or some other measure of variation. As it stands, all that can be done is to provide a range of occupation dates for the locality as a whole, with some distinctions made concerning the relative ages and dates of particular sites based on specific ceramic type occurences.

The predominant ceramic evidence points to an early to middle Classic Period occupation for the Superior base assemblage, beginning at about 1100 A.D. and ending sometime before 1350 A.D. 1100 A.D. is approximately the earliest date for the area, since all identified sites showed

Table 3. Prehistoric Artifacts: Pottery Types by Site

Site No.	Gila Salt & Plain Gila var.	Gila Queen Cr. Plain var.	Gila Red	Salt Red	Wingfield Series	Tonto Plain	Salado Red	Gila Polychrome	Pinedale B/r & Polychrome	Casa Grande Red-on-buff	Sacaton Red-on-buff
AR-03-12-02-88*	C		C	X	C			X	X	X	Z
-91*	C		C	X	C			X	X	X	
AZ U:12:8 ASU	C		C		X			Z			
AR-03-12-02-93			Z								
-94	C		C		X			Z			
AZ U:12:11 ASU				C		C	Z				
AR-03-12-02-95			X								
-96	X				X						
-97					X						
-98				X	Z						
-99			X	C	X					Z	
-100	C		C	X	Z	X	Z			Z	
-101	C	Z	C	X	C						
-102	C		C		X						
-103	C	X	C		C					Z	Z
-106	C		C		C						
-107	C		C		C	X					
-108					Z						
-109	C		C	C	X			Z	Z		
-110		Z			X						
-111	C	C	C		C	X				Z	
-112	C	X	C		C	X					Z

C - Common
X - Present
Z - Less than 5 sherds observed
No entry - no data or not observed on site surface
* - excavated site

Gila Red as a dominant type and few if any earlier types, though a very few Sacaton Red-on-Buff sherds were recovered from several sites. Thus, the beginning of this occupation could conceivably have begun in the late 1000's. 1350 appears to have been a maximum end date, as it is identified by the time range of Pinedale and allows for at least the introduction of Salt Red. The best approximation of the end date, then, would be sometime between 1300 and 1350 A.D. The small number of Salt Red sites as compared to Gila Red sites would also tend to indicate that the end of the area's prehistoric occupation was a gradual decline beginning before 1300 A.D., probably in the late 1200's (Tables 3 and 4).

Chipped and Ground Stone Tools

There was a wide variety of chipped and ground stone artifactual materials on all the prehistoric sites located on the base. All classes of chipped stone artifacts were represented - waste flakes, utilized flakes, and retouched formal tools. Materials used for manufacturing these tools and other artifacts were all locally available. These included rhyolite, chalcedony, chert, limestone, quartzite, a fine-grained grey basalt, and obsidian (see also Rule, 1977). The volcanic zone around the base of Picketpost Mountain is a major source of obsidian. It occurs as "Apache Tears" or nodules of obsidian in a perlite (hydrated obsidian) matrix. These perlite beds occur between the rhyolitic tuff and the deep, flow marked rhyolitic lava. These volcanic uplands, the mixed colluvial fan, and the streambed of Queen Creek together provided an abundance and variety of lithic raw materials. Compared to artifact inventories recovered by excavation at 02-88 and 02-91 (S.L. McAllister, 1977), very little in the way of ground stone material other than hammerstones remained on the site surfaces seen during the survey. This was probably due to a long history of surface collection ahd pothunting. What little was usually seen on site surfaces was mostly fragmentary and limited in variety. This was in sharp contrast to the excavated collections, which included whole manos and metates, a mortar and other grinding stones, a paint palette and two Sacaton style three quarter groove axes. With a few exceptions the materials used for these artifacts were all locally available: quartzite, a quartzitic conglomerate, gneiss, a hard welded rhyolitic tuff and local grey basalt. Non-local materials included a dense, fine-grained green diorite, used for the axes and a hard, black vesicular basalt noted as a metate and mano material at the rockshelter sites above the creek. This basalt does not appear to occur locally, but it is a common ground stone material at Hohokam sites in the Agua Fria and Salt River Valleys (Pueblo Grande Museum collection) and was observed to be fairly common along lower Queen Creek at such sites as AZ U:11:2 ASU. Since this is a very specific material not locally available, it may evidence a relationship between the Superior sites and the more "typical" Hohokam sites further downstream and to the west and northwest. Other trade or similar relationships based on mineral transport involving the Superior area also appear to have been present prehistorically. The diorite used for the axes was also tool specific, in that many or most of such tools found at any given Hohokam site around the Salt-Gila Basin were made of this same stone, regardless of time or place (Haury, 1976;

Table 4. Ceramic Chronology*

Type	Dates A.D.	Source
Gila Plain	300-1450	Breternitz, 1966
Gila Red	1100-1300	Wood, Ward, and Gasser, 1975; Haury, 1945
Gila Polychrome	1250-1400	Steen, 1962; Breternitz, 1966
Salt Red	1300-1450	Haury, 1945
Wingfield Series	700-1400	Weaver, 1974; Breternitz, 1966
Tonto Plain	1085-1400	Steen, 1962; Breternitz, 1966
Salado Red	1300-1350	Breternitz, 1966
Pinedale Black-on-red	1275-1325	Breternitz, 1966
Pinedale Polychrome	1275-1350	Breternitz, 1966
Casa Grande Red-on-buff	1100-1300	Haury, 1945
Sacaton Red-on-buff	900-1100	Haury, 1976

* Classic Period Hohokam type dates given here result from the compilation of a variety of sources, as well as excavation work by the author at Pueblo Grande.

Pueblo Grande Museum collection). This is a strong indication of a functional identity having been placed on that particular type of stone. In perhaps the other direction, obsidian and Apache Tears which might have come from the Superior volcanic field have been observed at a number of lowland and upland Hohokam sites of this period (e.g. Pueblo Grande and AZ U:9:42 ASU on the Salt River, personal observation; Escalante Ruin on the Gila River, Doyel, 1974) and at Salado and Sinagua sites as far away as Payson and Young, Arizona (personal observation), both over 100 miles to the north, under the Mogollon Rim. This distribution would tend to indicate an extensive, if possibly low intensity, obsidian transport and exchange network during the Classic Period, involving or even originating from the Superior locality.

Historic Artifacts

Historic artifactual materials were abundant throughout the base, but were, of course, especially common in the townsite area. Artifact types included cut and wire nails, solder sealed cans, bottle and jar glass, porcelain, ironstone, china, miscellaneous metal fragments, cast iron cooking utensil fragments, metal plates, and a variety of old cartridge cases dating from the late 1860's to the 1920's. These cartridge cases were uniformly for reasonably large bore to very large bore rifled weapons. More recent and modern cases, however, are predominately for small bore (.22 cal.) and smoothbore (shotgun) weapons, indicating a change in either shooting behavior or in choice or availability of game or other targets.

The historic materials found on the base were usually fragmentary, but all recognizeable pieces dated to the period of occupation known for Pinal. They were not particularly characteristic of any specific patterns of behavior other than general domestic and subsistence activities, though more may be expected to be found below the picked-over surface of the site.

Settlement Pattern Analysis

Introduction

Settlement patterning is at once a physical, impirical phenomenon and a dynamic adaptive process. It consists of the distribution of human activities expressed in the locations of various site types. These include habitation sites, topographic modification (agricultural feature) sites, and special activity sites. It also represents a pattern of responses to a variety of environmental considerations, both physical and social. Settlement patterning, then, is a representation of the relationships of human groups to their physical environment and to other human groups.

The level of analysis available to an inventory survey is, necessarily, limited and consists of associations between sites, site types, and environmental factors. Likewise, cultural relationships and temporal

assignments must remain on a similar level, based on ceramic and architectural similarities, despite the obvious shortcomings involved in equating social groups with pottery styles and construction techniques. More elaborate determinations of site interaction with particular environmental factors and with other site assemplages generally necessitates excavation. Such data exists for this particular area only for the several rooms excavated during the first phases of this project, and is not yet fully available.

A major consideration when utilizing observed associations between sites and environmental patterns, especially vegetative patterns, is that of temporal variation. In order for such associations to be useful, it must be demonstrated that change has either been minimal between the time of occupation and the time of observation, or that what change has occurred has been along predictable lines. This is believed to have been the case here. Alternatively, a non-explanatory position can be taken which serves to relate site location to presently observable environmental patterns uncritically, so as to provide predictions of site location from observations of present patterns, regardless of past relationships. Of course, this is not to say that the two are mutually exclusive; the analysis which follows is an attempt to combine the two approaches to produce both explanation and prediction. It is becoming increasingly important for cultural resource management studies and agencies involved in this management to make use of settlement pattern analysis due to its usefulness in land use planning. It is possible to develop certain reliable environmental criteria for particular areas which allow accurate prediction of the location and sometimes even density of cultural properties. The utility of such predictions is obvious. An example of a regional predictive model of this type can be found in the study of the Little Colorado Planning Unit, Apache-Sitgreaves National Forest (Plog, 1978, Wood, 1978a). Following from that, a local scale predictive model for use on the Gentry and other timber sales on the Tonto National Forest has recently been developed (Wood, 1978b). This is a strong argument for the expansion of clearance reports from mere inventory lists with no interpretive analysis to include at least some environmental and site location and distribution data. Agency surveys are conducted in a wide range of situations and locations, selected without archeological bias. As such, they can provide data on the distribution of cultural resources, as well as on those situations where they are not found.

There are also a number of professional interests in doing settlement pattern analysis. It is studied at the very least to find out where people lived and in what relationship to each other. It can also be used to define the potential resource zones in an area. From this can be gained insight into the various ways in which people have exploited, interacted with, and gained a living from different environments. Settlement data is also studied in order to learn something of the social dynamics of groups of people, the ways in which they interacted within and across particular territories. Different exploitive strategies and different social situations require different levels of organization and intergration and can support different sizes and densities of population.

In short, by studying settlement patterns a great deal can be learned about how the people once inhabiting an area lived.

Landform Correlations

The first of the hypotheses for dealing with this survey material proposed a dichotomy in settlement patterning based on the availability of alluvial farmland along Queen Creek, that where a terrace was present, sites would be concentrated and large in size. Where the stream evidenced no alluvial features or in areas away from the stream, sites would be small and scattered. It appears that both of these predictions were at least partially supported.

In the case of the ridge and floodplain prediction it soon became apparent that the only area along Queen Creek in the base that did not have some floodplain terracing was in the rock walled canyon between Pinal townsite and the west boundary of the base. The only sites identified in the canyon area were several very small rockshelters.

The prediction concerning the ridges also held true for the north side of the creek. Located within the area characterized as colluvial ridges adjacent to the stream terrace (Fig. 3), there are five habitation sites, all multi-room. In addition, on the west edge of the colluvial fan, overlooking the terrace is another multi-room site. This part of the prediction was well supported by the survey. The problem lies with the ridges of the lava flow. It was at first expected that large sites would be found on top. Once this surface was finally observed first hand, it was decided that there would probably be nothing in the way of cultural properties. Both predictions were wrong. Situated at the ends of the ridges were the heavily occupied rockshelters. These sites were reasonably well associated with the former floodplain and so could support the hypothesis. However, 02-97 is also located on these ridges. It is quite far from the creek and has minimal if any rapid access to it, as it sits above the cliffs. In addition, its form was completely different from any other sites on the base. For these reasons it is not felt that its location reflected the presence of the stream terrace, but was more closely tied to some other environmental or social factor not yet identified.

Ten sites from the inventory appear to have been associated with the stream terraces. All were located within 0.25 km. of the stream with most being much closer, at an average distance of 0.15 km. This suggests a real association between these larger sites and the alluvial resources of the stream. The isolated single room structures of the colluvial fan were all associated with either runoff areas along the major tributary wash to the east or with shallow grade runoff channels near catchment areas: five along the arroyo, five more scattered across the colluvium in three small catchment areas. These sites range in distance from the creek between 0.3 km. and 1.65 km. with an average distance of 0.85 km. The aberrant high ridge site 02-97 also fell into this category at a

distance of 0.38 km. These sites appear to have no strong overlap in distance from the stream with the other site group and appear to be more strongly associated with the smaller, more ephemeral and seasonal drainages.

These values are presented in the form of a contingency table (Table 5) of prehistoric site types and landform types. The two large habitation types and the two limited activity types have been collapsed into single types. It is evident from this table that small habitation sites are primarily associated with the colluvial fan, large habitation sites with the ridge/creek system, and limited activity sites with most landform types. The only prehistoric cultural manifestation of the Queen Creek terrace was a single limited activity site. Rockshelters, of course, were limited to very special environments and are henceforth eliminated from further analyses. For the same reason, so are limited activity sites, which seem from this and other analyses to show no zonal patterning, but appear to be as specific to particular points in space as rockshelters. Collapsing the remaining site types into small habitation (types 2 and 3) and large habitation (types 4 and 5) categories and collapsing landform categories into ridge and fan, the association can be tested in another way (Table 6). Utilizing Fisher's Exact Test (Thomas, 1976) for small cell frequency 2 x 2 contingency tables, the probability of obtaining an association as extreme or more extreme than this by chance alone is 0.02. This indicates that the association seen in the table between small sites and the colluvial fan and between large sites and the Queen Creek ridge system is a significant one at the .95 level of confidence. It is suggested that the reason for these associations lies in the distribution of arable land, that site size is a function of arable soil quality and extent. Thus, large sites are associated with but, on the basis of the terrace recovery, not located directly on, the once continuous larger area Queen Creek floodplain. Small sites are associated with the smaller area discontinuous artificial arable land parcels (check dams and terraces) in the colluvial fan. Since no measurements were taken on check dam or terrace parcels (nor is any system known that would accurately evaluate farming plot size behind a badly eroded check dam), this suggestion that site size is directly related to arable parcel size, while borne out in other areas (Plog, 1978), must remain an hypothesis to be further tested when techniques for determining the aboriginal extent of farmed parcels are developed. Still, average site size for habitations associated with upland agricultural features was 1.5 rooms while those sites adjacent to the former Queen Creek floodplain averaged 5.1 rooms per site. At any rate, these tests demonstrate a close association between site types and landform types. In summary, then, there are two distinct groups of habitation differentiated by their relationships to the creek: one along it, the other away from it in the desert uplands.

Vegetation Correlation

The original hypothesis for the survey dealing with site/vegetation associations held that site size or density would increase in or near

Table 5. Site Type and Landform Correlations - Excavation and Survey Sites

Landform Types	Site Types					
	1	2	3	4&5	7&8	Totals
ridge	0	2	0	3	1	6
fan	0	12	1	0	1	14
terrace	0	0	0	0	1	1
other	4	0	1	0	0	5
Totals	4	14	2	3	3	26

Table 6. Habitation and Landform Correlations - Excavation and Survey Sites

Landform Types	Site Types		
	small	large	Totals
ridge	3	3	6
fan	13	0	13
Totals	16	3	19

zones containing especially useful economic plants; specifically, saguaro, jojoba, and mesquite. There is some indication of an association of the upland sites with saguaro stands, but it isn't conclusive. All the upland colluvial sites were within the bounds of a saguaro stands or not more than 0.25 km. away from one, but there were more outside than inside and there was no difference in their relative sizes. The other problem was that few of the other sites in the base were anywhere near a saguaro, much less a jojoba. The hypothesis was not supported.

There was a stronger association of site density with the mesquite bosque along the creek. None of the creek side sites were more than 0.2 km. from that, and the creek side manifestation was certainly more dense than that of the colluvial fan, where there probably was little or no mesquite in the prehistoric past. These is very little there now. This association is complicated, though, by its overlapping with the stream terrace association.

Despite these suggestive correlations, it is believed that the associations are actually coincidental. The locational criterion for sites in this area appears to have been primarily to do with arable land situations and only secondarily, if at all, with vegetation patterns. The original hypothesis may not be testable here, since there is so much variation in topography, edaphics, and hydrology for such a small area. The distances between stands are minimal, allowing for more or less equal access to all zones for all sites. The maximum distance between different vegetative stand is only 0.6 km. from the major saguaro-jojoba stand to the lava flow, and for most of the creek side sites, access was almost immediate between several stands. At 02-106, the largest single site in the area, all the various zones were within a radius of 0.5 km. The same is true for AZ U:12:11 ASU and even for 02-97. In fact, the maximum distance of travel for access to the four major zones even for the most outlying single room sites on the colluvial fan is less than 2 km. This is not even an hour's walk and all four zones could be picked up on a single line to the stream. This is in contrast to the immediately adjacent agricultural resources of the colluvial fan check dams and terraces outlined above.

While some of these spatial relationships tend to suggest that site density is related to maximum access to vegetative zones, the difference between a 0.5 km. radius and a 2 km. transect is not that much, especially considering the easy terrain. There is also the complication of the overlapping physiographic associations. Besides, identical patterns are also available in other areas just outside the base. Therefore, maximal access to particular vegetative zones may - or may not -be an important locational consideration here. The sample provided by the base is too small to show all the relevant patterns of access, since Queen Creek also passes across the northeastern part of the base, repeating the creek-to-desert zonation in another direction.

The problem stems from the strong control of physiography over vegetative patterns in the Sonoran desert. It is extremely difficult to separate

the effects of the landform/edaphic and vegetation factors, since they are so closely tied. Where there is relative homogeneity or repetition in physiography and thus equal access to agricultural resources, as for example, along the margins of an extensive floodplain, then relative proximity and differential access to a variable flora may be a major locational factor. It was the case along Pinal Creek (Wood, in press), where just such a situation occurred. Here there is both a good deal of physiographic variability and differential access to agricultural resources, especially those along the creek. Access to vegetation was apparently a secondary consideration when it came to locating an agricultural settlement in this area, and perhaps in all areas where agricultural land is scarce or has to be constructed.

Agricultural Patterns

Agriculture and Subsistence

The assumption of this analysis is that the prehistoric population in this area was dependent on agriculture to serve some function in the behavioral system of that population. It is not, however, automatically assumed that this function was necessarily or totally one of providing subsistence. It has been observed from the analysis of excavation data (Gasser, 1976) that a high percentage of Hohokam subsistence was derived from wild food gathering. It has, however, also been observed by excavation that sedentary populations in the Southwest, represented by architectural and ceramic manifestations similar to those here, utilized plant foods and products which can only be obtained by means of cultivation, e.g. corn, beans, squash, and cotton (Gasser, 1976). On this basis, the sites identified here are assumed to have utilized the technological behaviors of agriculture to provide materials necessary to some social and/or biological needs(s) of the population.

Agricultural Features

During the course of the survey, a variety of agricultural features were located, all of which were associated with the upland sites of the colluvial fan. These features included check dams, contour terraces, and cleared terraces.

Check dams as they occurred on the base were typically constructed of large boulders and cobbles laid in more or less straight lines across shallow, low relief runoff channels. They ranged in size from less than 2 meters to more than 20 meters in length and from 10 cm. to 30 cm. in height, built up with one to several courses of building stone. They were usually located in series along these ephemeral drainages, but were also found singly or in pairs and triplets on small segments of suitable grade on particular channels. Nearly all these structures were built on channels with 4° grades, ignoring adjacent areas of greater or lesser grade, indicating that agricultural locations in the uplands were selected according to recognized standards of hydrology and topography.

The longest series of agricultural features was recorded as the second locus of AZ U:12:8 ASU and contained over 90 still recognizeable structures. Their effectiveness as water control facilities can be seen in the many instances where runoff channels, recently gullied, have bypassed the check dams without cutting into them. Nevertheless, many of them have been disrupted by recent channel trenching acting on many years of neglect. Where they are still intact, the check dam sediment traps support a denser annual vegetation population than anywhere on the ridges or elsewhere along the channels. Where they have been breached or bypassed, they are as barren as any other gully bottom.

Contour terraces are the non-channel equivalent of check dams, designed to control and retain sheetflow overland runoff. Also made of large boulders, these features are seldom more than a single course high. Nowhere near as common as check dams, (13 to 137), their importance to the upland agricultural technology was probably secondary.

Cleared terraces were found at two sites, 02-93 and 02-109. Essentially these consist of relatively flat benches along the banks of the major arroyo in the eastern section of the base. Before the many entrenchment episodes observable in the arroyo, these narrow steps, now discontinuously distributed high on the ridges bordering the arroyo channel, were probably part of a narrow floodplain or terrace. Their location below the ridge crest provides them with runoff which would normally sweep into the arroyo and degrade the edges of these small banks. However, the two observed at these sites have been cleared of the original cover of colluvially deposited rocks, which were systematically piled up at the edge of the arroyo bank. This provided both a fine sediment trap and runoff collector with the added benefit of a rock and gravel apron to prevent erosion at the channel edge. Runoff channels across these terraces were check dammed to provide more water, silt, and erosion protection (Fig. 6). A variation of this practice was found at 02-109. There a large cleared terrace was supplemented with stepped runoff terraces inside, each about 10 - 20 cm. high (Fig. 18).

These examples are representative of a highly developed upland agricultural technology based on the manipulation of surface overland water flow. This same technology has been noted in a variety of Hohokam archeological contexts and appears to have been at least as important in the overall agricultural production system as irrigation (Canouts, 1975; Debowski, et al., 1976). It has been demonstrated elsewhere by experimentation (Evenari, et al., 1970) that clearing surface rocks from upland agricultural fields increases runoff, which can then be manipulated by diversion and collection facilities (walls and dams). It was also noticed during this experiment that such a system is only workable in arid regions and that it is most effective where rainfall is less than 20 mm. per day. Thus, it can be demonstrated that Hohokam upland agricultural techniques were not only adaptive, but efficient and productive as well.

No artificial agricultural features were located along Queen Creek, either in isolation or in association with any of the habitation or limited activity sites. It is true that historic construction has disrupted much of the surface, but even in those areas where minimal disruption has taken place, none were observed. This area has a number of suitable runoff channels of the appropriate grade, but none seem to have been utilized. This being the case, it seems likely that the sites located along the creek made use of the floodplain for farming.

The pattern of agricultural feature distribution observed in the base indicates two distinct farming practices. In the uplands, use was made of either artificial pockets of sediment and moisture, while along the creek farming was done on the natural stream terraces and floodplain, utilizing a reliable and probably constant water supply and deep fertile soils. Both techniques appear to have been in operation contemporaneously and were used by the same people, based on the similarity in artifactual expression in the two groups of sites. This presents a view of a highly complex agricultural system adaptable to a number of dissimilar local environments within the highly variable Sonoran desert. The distinction between the two patterns seen on the base seems to indicate, further, that population density within the system as a whole was dependent on the size of available parcels of arable land. The largest and most concentrated part of the base population was located along a continuous floodplain/terrace while smaller groups were scattered around the fan in association with small artificial farming plots.

The Relationship of Agricultural Patterns to Settlement Patterns

Some substantiation is needed for the claim made above that access to agricultural resources was the major locational factor for the prehistoric base population. Returning to the original hypothesis, it was predicted that sites associated with the floodplain and terraces would involve little or no agricultural construction, since fields were ready-made on the alluvium, subject only to clearing vegetation. Sites on the upland colluvium were to have a high ratio of agricultural features to rooms. This prediction can, of course, be easily tested. The relative numbers of rooms and agricultural features are presented in Table 7.

Using the same spatial groupings as before - those habitation sites less than 0.25 km. from the stream and those more than 0.25 km. from it (excluding special activity sites and the canyon west of the townsite) - the dichotomy between the two groups based on association with agricultural construction is obvious.

For the purposes of this analysis, the problems of contemporaneity of room occupation and the percentage of occupied rooms at a given site at any given time and overtime will be ignored, since these data are not available for desert archeological populations. Such data for other populations in the Southwest is available, however, and will be used in another approach to this analysis to be presented below. Even without

Table 7. Ratios of Agricultural Features to Rooms*

Upland Sites			Creek Sites		
Site	agricultural features	rooms	Site	agricultural features	rooms
AR-03-12-02-88	7	1	AZ U:12:11 ASU	0	2
-91	7	1	AR-03-12-02-100	0	2
-93	8	2	-101	0	12
-94	5	1	-102	0	2
-95	8	1	-103	0	12
-96	1	1	-106	0	13
-97	1	5	-107	0	6
-108	0	1	-110	0	4
-109	7	1	-111	0	2
-140	7	1	-112	0	1
Totals	51	15	Totals	0	54

*Agricultural features defined as check dams, boulder line terraces, and cleared terraces, without adjustment for differences in area. Room counts derived from minimum possible number of separable rooms observable at masonry habitation sites. Cave sites without walls counted as single rooms. Special activity sites and agricultural features without close and apparent associations with habitation structures disregarded.

this data it is nevertheless possible to look at room densities and ratios of rooms to agricultural features to gain an approximation of the patterns once operative on the base.

The overall average ratio of agricultural features to rooms is 3.4 to 1 for habitation sites on the colluvial fan. For those sites in this area which were specifically associated with constructed features, the average is 6.1 to 1. There are over 155 of these structures on the colluvial fan. There are none in the rest of the base, an area twice the size of the colluvial fan. Thus, the overall ratio between all agricultural features and all rooms on the fan is approximately 10 to 1, as opposed to the 0 to 54 ratio observed along the creek. It is apparent from this that there were two distinct types of environmentally patterned settlements inside the seemingly small area of the base. Selection within these patterns appears to have been based on the availability of agricultural resources, dichotomized by the availability of two distinctly different types of agricultural resource: the larger and more densely settled population being found in proximity to the larger, more contiguous, and better watered of the two types.

Locational Analysis

Introduction

Another approach that has been applied to the study of settlement patterns in recent years is known as locational analysis (Haggett, 1971; Flannery, 1976). Within this geographical approach there are six major indices or characteristics of settlement patterns which can be studied to derive behavioral implications from site types and their distributions (Plog, 1974). These are: density, evenness, agglomeration, differentiation, hierarchy, and integration. Normally this approach is regional in scope, strongly statistical, and based on a variety of geographic models. However, owing to the small size and shape of the base, making it highly susceptible to edge effect, the interpretation of these types of data from this area must necessarily be somewhat simplistic. It will also be subject to change at any time as more areas around the base is surveyed. Still, despite the non-regional nature of the sample, certain statements about the population it represents can be made using this approach.

Density

This measure is an indication of the intensity of prehistoric occupation. Both it and the many problems that go along with its use were discussed above. It gives only a minimum of implications regarding levels of intersite organization and interaction - the level of organization implied by the measure is more or less equivalent to the measure: moderate.

Evenness

This locational index is a measure of the degree of dispersion of sites across the landscape. The patterns it describes are random, clustered, or competitive (more or less regularly spaced): it is a measure of the variation in site density. Two statistical measures are often used to produce this index: the nearest neighbor statistic and Morill's Index of Contiguity. Neither of these was considered applicable to the base, owing again to its small size and edge-susceptible shape, both of which could badly skew the measure. Nevertheless, there is a pattern of tight clustering of larger prehistoric sites along the creek and a more dispersed distribution of small or sites on the colluvial fan. This pattern can be derived from densities in the two geographic divisions of the base. There is a site density of approximately 25 sites per square kilometer for the area within 0.25 km. of the creek while the density for the fan is only about 3.4 sites per square kilometer. This difference indicates a differential distribution of settlement and supports the conclusions of the environmental settlement pattern analysis.

Agglomeration

This measure of the variability in population distribution over sites is seen here in terms of a ratio between large and small habitation sites and in terms of the percentage of the total number of rooms in the population contained in each size class. For the base population, as expressed in Tables 1 and 7, the ratio between sites larger than mean size (3.5 rooms) and those smaller than mean size is 0.43, indicating a skewed size distribution favoring small sites.

Room distribution into site classes was as follows: 11.6% of the 69 rooms or their equivalents (i.e. separable rockshelter alcoves of or larger than room size) found on the base were in rockshelters, all of which would be considered small; 15.9% were in small one or two room structures; 15.9% were in medium-sized 3 to 6 room sites; 34.7% were in large dispersed but proximate villages (rancherias); and 18.8% were in the single large compact aggregated site. Thus, while over half of the local population lived in closely proximate groups of one kind or another, the number of people as indicated by rooms actually living in a single aggregated structure was hardly more than that dispersed in the small farmstead sites. Considering that even the rancheria at the east end of Pinal townsite was composed of small structures containing only 1 to 4 rooms, it can be demonstrated that over 80% of the base population lived in facilities of four rooms or less in size. While the temporal data necessary for establishing trends is somewhat lacking, it can be seen that population aggregation was limited in the base and that a pattern of essentially dispersed housing was maintained for all but one site, 02-106. Still, this one site may once have held a major portion of the local population. It might be argued that this site represents the final stage in a process of local aggregation, but ceramic and C-14 dates (see below) indicate that the colluvial fan farmsteads were contemporaneous with this site and probably even outlasted it. This would indicate that aggregation

within the base population was a phenomenon operating only within one segment of what was apparently a strong rancheria tradition. This pattern is an extension and continuation of pre-Classic Hohokam settlement patterning (Haury, 1976). It is also a reflection of contemporary organizational developments in the early Classic period of the Salt-Gila Basin (Haury, 1945; 1976), where large aggregated structures were becoming the central focal points of large rancheria settlements as an expression of a developing organizational hierarchy in the social-economic system (McAllister and Wood, in press).

Differentiation

This characteristic of site populations is an attempt to measure differences in site function and is often expressed in terms of a ratio between limited activity sites (non-architectural) and the overall number of sites of all types. This index of variability in function is only 0.095 for the base (see Table 2). For all the 24 prehistoric sites recorded during this survey, the index is 0.125. Neither measure indicates very much functional differentiation at the site level. Whatever behaviors are represented by these habitation and limited activity sites, the primary local behavioral focus was around the habitation site.

Another potential measure indicative of behavioral differentiation in this area may be the ratio between habitation sites associated with agricultural features and those that are not. The index, based on Table 7, is 1.00, reinforcing the behavioral dichotomy in agricultural practices discussed above. However, it does not add any information not already discussed.

A problem critical to the understanding of this and any other archeolobical manifestation in the Southwest which can be dealt with in this context is that of the function of the small one and two room sites on the colluvial fan. It has been often suggested (e.g. Doyel, 1978b) that such small sites, at least when found in association with nearby contemporary large sites, might be seen as seasonal in occupation. Thus, they might be regarded as a form of limited activity site. These small one and two room structures are sometimes called "fieldhouses" after an historically observed Pueblo Indian practice, and are assumed under this name to have been used to house individuals and families near their fields during the agricultural season. However, any blanket assertion such as this is unwarranted in the lower Sonoran desert area at least and probably for most of the Southwest as well. It was almost certainly not true for the Superior locality. The ground stone tool assemblages at the excavated sites 02-88 and 02-91, both small farmsteads, conformed to patterns accepted as representing full time permanent habitation (S.L. McAllister, 1977). As well, a full range of other artifactual materials, decorated and plainware pottery, deep trash mounds, and considerable architectural labor and sophistication were observed in the excavated structures, all of which combine to support an interpretation of permanent occupation (Doyel, 1978). Finally, the distance involved in

travelling from the creekside rancherias to the small check dam farmsteads is minimal - less than an hour's walk at most. It is felt that it would have been logistically untenable to pack up, build another house just as substantial as the one back "home", and move 850 meters away from the creek during the summer just to be with the corn. Instead, it would seem that the differentiation seen in this situation reflects a more complex behavioral context than seasonal population dispersal. Inventory data from the Tonto National Forest alone would tend to dispel this idea, as the isolated one or two room farmstead is the most common type of site known on the Forest. The fieldhouse concept may indeed be valid for some areas and periods in the prehistory of the lower Sonoran desert, but it does not appear to explain the distribution of people and sites in the Superior locality.

It could be said that the colluvial fan farmsteads represent population expansion out of the rancherias in partial response to pressure on the primary agricultural resource along Queen Creek. However, the C-14 dates from the 02-91 excavation do not support this contention, as the farmstead sites appear to be at least as early as the creekside sites. Corrected C-14 dates from the single burned beam from the lower (?) floor of the structure are: 1080 ± 100 A.D.; 1140 ± 100 A.D.; and 1180 ± 110 A.D. (L. D. Smith, personal communication). At any rate, the small fan sites do not appear to have been any less substantially occupied than the creekside sites. They do appear to reflect an adaptive variability in a primary behavioral pattern which depended on sedentary agriculture. As such, these smaller sites would have been organizationally but not necessarily functionally different from the larger sites. Both can be seen as components of a single complex economic and organizational pattern in which both site types interacted through time.

Hierarchy

The term hierarchy in this context refers primarily to the extent to which a full range of site types and sizes is present. As can be seen in Tables 1, 2, and 7, there is a very limited range of sizes and types on the base. Nevertheless, there was a measure of organized site hierarchy in this population, evidenced by the presence of the single aggregated site, 02-106, in the midst of a prevalence of smaller structures. Thus, there is at least the suggestion of a two level organizational hierarchy.

Integration

This measure is an indication of the degree of association between sites. While no quantification has been made for this population, owing to the lack of a collected artifactual data base, it is suggested that this index is high, at least in terms of the apparent similarities observed between site surficial artifact assemblages and architectural forms. Considering the functional and hierarchical differentiation, the base population would seem to offer an excellent opportunity for the detailed investigation of this characteristic.

Conclusions - Locational Analysis

The various indices discussed above indicate that the prehistoric population of the base operated within a behaviorally integrated, functionally differentiated, and slightly hierarchial social/economic organization. The system inferred from this seems to have depended on agricultural resources as a primary basis for population distribution and behavioral differentiation. The distinct dichotomies between the aggregated and dispersed settlement types and between the floodplain and check dam farming patterns strongly support these inferences.

Support - The Lakeside Land Exchange, Superior Parcel

Five months after the completion of the south half base survey, another archeological survey was conducted within the larger confines of the Superior base (Wood, 1976b). Six prehistoric sites were located by this survey in a parcel of approximately 32 hectares, about a kilometer north of Pinal townsite. These sites conformed to the distributional patterns expressed above. Four of the sites were small farmsteads in the upland ridges, associated only with ephemeral drainages. Three of these had nearby check dam and terrace systems. One of the remaining two sites was of the "upland type", but was without any nearby agricultural features. The one "large" site recorded by this survey, containing four or five rooms, was located on a ridge overlooking one of the major tributary washes of Queen Creek, at the point where the wash opens up into a fairly substantial floodplain. A seventh site, located several years after this survey during one of many revisits to the area, was a small one room basalt structure with an adjacent rock outlined "brush kitchen", overlooking a small gravel-surfaced sediment basin and half a dozen check dams. Artifactual and architectural similarities indicated that these sites were contemporary with those of the south base and formed part of the same population. Thus, the inferences made above regarding settlement patterning on the base appear to be supported by this second (and subsequent) survey. Current in-Service and other (e.g. Yablon, 1978) investigations in the Superior-Queen Creek area indicate that these patterns were general throughout upper Queen Creek drainage, at least for the area above the Arnett Creek confluence.

History and Development

Prehistoric Development on the Base Overview

The agriculturally patterned settlement system observed on the south base appears to reflect a self-contained adaptive system that should have required only a minimum of contact with any larger social or economic organization. Farmland, water, building materials (other than timber - juniper used in the construction of 02-91 probably came from the mountain), raw materials for tools, and a variety of wild foods were all abundant in the area. In this environmental context, with possible input from a minor obsidian trade network, the prehistoric population of the base maintained an apparently viable existence for as much as 200 years. This was longer than the life span of most Anglo cities and towns in

Arizona and far longer than the Anglo town which eventually replaced it.

The area was probably colonized by a larger group from further downstream on Queen Creek, evidenced by the sudden appearance of late pre-Classic and early Classic Period ceramics, but the self-sustaining nature of the area's resource base makes it doubtful that any other entity would have had an immediate or controlling effect on the everyday subsistence economy of the new settlements. This population, therefore, is an example of the general pattern of regional differentiation which characterized much of the early Hohokam Classic Period (Doyel, 1977). Perhaps as a function of this self-sufficiency and apparent isolation, certain characteristic organizational patterns of Soho Phase were not adopted or utilized in the Superior-Queen Creek area. The lack of compound villages and platform mounds mentioned above, along with the retention of very small building units in a rancheria pattern, while possible reflecting population density dependent variations in the overall organizational system of the phase, is general and characteristic along all but the lowermost reaches of the drainage. It would thus appear that certain of the central organizational features of the phase were not adopted, indicating the development of a local variant, somewhat distinct from the more typical Soho Phase to the west and from the Roosevelt Phase to the east. It is proposed here that this variant be tentatively designated Queen Creek Phase, to identify the first local organizational development on the drainage and the terminal manifestation of Hohokam occupation in the area.

Despite the distinctiveness of the local development the Superior locality community appears to have had some strong organizational ties elsewhere. These are seen in its non-local origins and its strong similarity in terms of technological behavior to other Hohokam populations in similar environmental settings. The hierarchical differentiation of site sizes and functional differentiation of types also supports the inference of a system of regional interaction, since the patterns present on the base so closely parallel those at other Classic Period localities. Nor is a more or less self-contained local subsistence incompatible with participation in a larger system. Local everyday autonomy is highly adaptable for such a system, since it helps to maintain overall regional system flexibility by increasing the pool of information available for adaptive use in changing locations or circumstances (Peebles and Kus, 1977). On the other hand, these indications of outside contact and involvement may aid greatly in explaining the eventual abandonment of the area.

Prehistoric Colonization and Abandonment

There are a number of specific artifactual similarities between the Classic Period Hohokam communities of lower Queen Creek and Superior. Both utilized similar construction techniques and architectural forms. They display identical ceramic inventories and technologies. Specific ties relating to the colonization are found in two patterns within this similarity. First, Queen Creek variety Gila Plain, a pre-Classic type, was present on a few of the sites closest to the creek; the caves and at least one of the rancheria sites. Secondly, in the cave sites, there

were fragments of grinding stones made from a dense, hard, black vesicular basalt. This stone is not available anywhere near Superior, but was a common groundstone material at AZ U:11:2 and 3 ASU and elsewhere along lower Queen Creek (personal observation; notes). It does not occur in any other sites on the base. There are also several distinct temporal correlations. Present evidence from excavation and from this survey (ceramics and C-14) indicates that the base was uninhabited prior to about 1100 A.D., during which time there were a number of large Hohokam communities on lower Queen Creek. At around 1100 there was apparently a considerable amount of reorganization and resettlement along lower Queen Creek (Scoenwetter, Gaines, and Weaver, 1973). Many large sites, such as AZ U:11:2 ASU, while not immediately abandoned, lost considerable portions of their populations. This is reflected in the much smaller sizes of Classic Period artifact scatters and smaller numbers of rooms; AZ U:11:3 ASU appears to have contracted from the Sedentary Period size of AZ U:11:2 ASU (5 to 7 hectares) to something less than a fifth of what it had been, contained entirely within the boundary of the older site. Other Sedentary Period sites were abandoned completely and new Classic Period sites were founded in different locations. The inference is that one aspect of the Classic Period reorganization of the Queen Creek Hohokam community involved the colonization of the Superior locality.

In light of the types of changes in local environment encountered when moving from the creosote-palo verde desert and mesquite riparian of lower Queen Creek to the palo verde-saguaro uplands and mesquite riparian of Superior and the apparent transplantation of an existing organizational system, this colonization would seem to fit the models of "range expansion" or "budding" proposed for the Hohokam by Grebinger (1971). It also appears to exhibht the types of expansion commonly seen in chiefdom and higher level organizational systems (Service, 1971; McAllister, 1976; Wood and McAllister, 1978; in press), in that the initial expansion served to incorporate an area similar to that of the original occupation into the existing system.

The initiation of the Superior colonization was apparently a response in large part to environmental changes. The drought of A.D. 1070-1125 and the channel trenching that would have accompanied and followed it during the period 1100 to 1200 probably caused some disruption of the subsistence and economic patterns of the densely populated Hohokam communities of lower and middle Queen Creek (Dean, 1970; Schoenwetter, Gaines, and Weaver, 1973; Schoenwetter and Dittert, 1968; Weaver, 1972; 1974). This disruption apparently brought about the relocation of some sites and the consolidation of others (Schoenwetter, Gaines, and Weaver, 1973). Part of this relocation appears to have involved migration to areas along the Creek which were not yet entrenched. A similar pattern of "headward migration" has been documented for a prolonged trenching sequence in the Navajo Reservoir District (Shoenwetter and Dittert, 1968) and for a shorter sequence in the White Mountains (Wood, 1978a). Such a pattern does not seem out of place here and is compatible with the models proposed.

Scenario - Upon arrival in the Pinal district of Queen Creek, the colonists appear to have taken up residence in fortuitous habitations, specifically, the cliff face rockshelters. These shelters overlook the Queen Creek floodplain, an equally fortuitous agricultural resource which would not have required any construction to utilize. Since even people on the move or moving to new homes need to eat, they may have brought along manos and metates from downstream. This might explain the fact that the only black vesicular basalt grinding stones on the base came from these caves. That transportation of metates during times of planned migration was actually practices in the prehistoric Southwest is becoming more evident with recent research (Gumerman, 1970; S. L. McAllister, personal communication). In time, the immigrants would have built a small community of stone masonry-founded semi-pit houses on the low ridges and colluvial fan.

The farmsteads on the fan were apparently the last part of the community to be abandoned. This probably took place in the early 1300's, soon after the introduction of Gila and Pinedale Polychromes into the local ceramic inventory. The "great drought" and strongly summer seasonal rainfall pattern that hit much of the Southwest between A.D. 1276 and 1300 would have put an end to floodplain farming along the smaller streams at the edge of the Sonoran desert. This includes Queen Creek around Pinal. There would have been a lower water availability and an increased labor input to keeping up the fields, as they would have been difficult to maintain during the summer storms and floods which would have quickly gullied and trenched the stream channel. The upland sites may have held out into the mid-1300's by utilizing the runoff control systems on the colluvial fan. Owing to their much smaller catchments, these systems did not have to contend with the volumes of water produced by Queen Creek in summer flood.

Discussion - The scenario presented above may be supported by the data currently available from the base in several ways other than those just described. There is a photograph of Pinal and Queen Creek (in Sherman and Sherman, 1969) taken just before the last, disastrous By 1871 the road, known as the Stoneman Grade, was completed, climbing up from what was later to become the site of the town of Silver King to cross the face of the Dripping Springs Mountains. From there the road channel trenching episode in southern Arizona, which began in 1890 (Hastings, 1961; Hastings and Turner, 1965). This photograph shows the creek running through the rounded trough of an old arroyo, cut about a meter into the former floodplain. This same channel is now entrenched to a depth of two to three meters. The last known major trenching eqisode in the deserts of southern Arizona prior to 1890 appears to have been the one which took place during and after the "great drought" (Hastings, 1961; Hastings and Turner, 1965; Hack, 1942). If the gullying evident in the photograph is actually a result of that particular episode it would provide substantial support for the model developed here. Pollen analysis from the excavated farmstead sites 02-88 and 02-91 indicates an occupation during one of two very dry periods, probably those between A.D. 1070 to 1125 or 1276 to 1300 (James Schoenwetter, personal communication). Quantitative ceramic

analysis from 02-88 indicates an occupation beginning in the late 1200's and ending at about 1310 A.D. (L. D. Smith, personal communication). The C-14 and ceramic dates described above for 02-91 indicate an occupation for that farmstead beginning during the earlier dry period, centered around A.D. 1100, and continuing to at least as late as 02-88. Thus, the best dates available for the base population tie the beginning of that occupation to one entrenchment episode and the end to another, with continuity between the two.

The creekside sites offer more of a problem, since none have been professionally excavated and all have been disturbed by historic and recent occupation, recreation, and vandalism. Nevertheless, certain observations can be made from surface ceramics. First, on the basis of datable pottery types found at the farmstead sites but absent from the creekside sites, the creek sites appear to have been abandoned before the farmsteads, sometime in the late 1200's. However, this patterning was not entirely cut and dried. A late pottery type found at the farmsteads was also found as isolated sherds at several of those sites nearest the floodplain. This type, Salt Red, also made up the dominant type at AZ U:12:11 ASU, 02-98, and 02-99. No other late types were noted at these sites, save for a few sherds of Salado Red at the latter two. One potential explanation for this might be that a small population continued to occupy the creek sites after the major part of the local population had moved out. Another is suggested by the nature of these late creekside sites. One was a limited activity locus composed of a scatter of Salt Red ceramics and hammerstones with little in the way of earlier pottery or other artifact types. It was located on the former floodplain just overlooking the creek. As such, it was one of the few limited activity sites on the base and probably represents some post-A.D. 1300 exploitation of the riparian or floodplain resources of the creek. From its ceramic makeup, it appears that one of the other sites, AZ U:12:11 ASU, was built and occupied only after the other creekside sites had been abandoned. In addition to its lateness, this site was different from the other creekside sites (with the possible exception of 02-100, with which it also shared some ceramic similarities) in that it was constructed on a hilltop out of basalt blocks. The last of these late creek sites was a very small rockshelter, possibly only a storage facility, in the canyon west of Pinal townsite. It is likely that this site and the limited activity site 02-98 represent little more than patterns of use on the abandoned creekside by the occupants of AZ U:12:11 ASU, based on the similarity in artifactual inventories. The question can not be fully resolved until more detailed chronological studies are made, but it appears at this time that the creekside community was almost totally abandoned prior to A.D. 1300 and before the farmsteads. The upland community appears to have continued to perhaps as late as 1320 or 1325 A.D. In many ways this is not surprising, as the fan would have been more capable of supporting agriculture in the 1300's than the entrenched Queen Creek floodplain, owing to the relatively high rainfall of the locality and its very long growing season (Sellers and Hill, 1974). All these factors would have operated in favor of the fan agricultural system.

This discussion, therefore, suggests that the upland part of the Hohokam population on the base could have survived the "great drought" and, in the wetter 1300's, should have flourished. Only the floodplain would have been lost to trenching. Domestic water would have remained available in Queen Creek and the fan could have been farmed even more extensively. And yet the entire locality was abandoned in the early 1300's. Nor was there any short term increase in population on the fan after A.D. 1300 -only two or three of the farmsteads can even be dated to that time by ceramic associations. The creekside population left the area, only with some of the fan population, and in time was followed by the rest of the fan population, as if the idea of adopting a familiar but lower level adaptive/organizational pattern for the entire community did not even reoccur to its inhabitants.

The termination of occupation following the Queen Creek Phase places the Superior locality and Queen Creek in general in sharp contrast to the nearby Tonto Basin and Globe-Miami areas, where population continued to grow rapidly through the following Gila Phase, producing a number of large aggregated sites such as Besh-ba-gowah and Gila Pueblo. One such site, Togetzoge, was located less than 10 kilometers from Superior in the headwaters of Pinto Creek drainage well beyond the cliff wall of Apache Leap. A similar site has been reported, more or less as a rumor, from the townsite of Superior itself, though its presence has yet to be verified. Nevertheless, it, and its implications regarding the scenario presented here must remain a possibility. However, there is some parallel evidence for the scenario model in that the nearby middle Gila River area also evidenced a decline in (although not entirely a termination of) Classic Period occupation (Debowski, et al., 1976).

It has been assumed here that the initial occupation of the Superior area was probably a response to drought and other areal economic considerations which produced both agglomeration and diversity in the Classic Period Hohokam populations of lower Queen Creek. It would also appear that the creekside community was abandoned in response to a similar series of stresses. The problem lies in explaining the abandonment of the colluvial fan.

The patterns of development seen in the Queen Creek Hohokam sequence support the contention that this population participated in the high level complex social organization posited for the Classic Period Hohokam (McAllister, 1976; Grebinger, 1971; Gerald, 1976). It has been suggested (Schoenwetter, Gaines, and Weaver, 1973) that the lower and middle sections of Queen Creek drainage were abandoned in response to stresses on such a regional system, rather than to strictly local problems, brought about by drought, reduction of streamflow by irrigation, development of a caliche hardpan in the Queen Creek delta, and the final waterlogging of fields in and above the delta. Assuming local participation in the regional system of Queen Creek, the Superior abandonment might be explained in terms of this larger phenomenon. Trade and social relations following a sudden drop in population density along the drainage may become too tenuous to

maintain the Superior population in terms of available non-subsistence goods and services. Rather than attempt a lower level organizational move to the fan, it may have been that the creekside population moved away to an organizational environment more similar to that which had developed along the creek. This could explain part of the lack of purely post-A.D. 1300 sites on the fan. It has been demonstrated elsewhere (Stevenson, 1968) that there is a positive relationship between population density and social complexity. The dispersal of settlement apparently necessary on the fan to enable its agricultural exploitation would not have allowed the same level of population density as along the creek, and therefore could not have supported any local density-dependent complex organization. And without the support of a larger regional density-dependent organizational system, the subsistence farmers of the colluvial fan may have finally followed the creekside community in leaving the Superior area for a more viable social, economic, and organizational environment. Integration into larger social and economic units implies a relatively great investment in social and economic ties to this entity which are necessary to maintain the integrity of the system. Once such investments are made, it becomes difficult to break the commitment. Little else could as easily explain the abandonment of the fan sites at a time when their agricultural system would have been most productive. If so, the abandonment of the fan provides parallel support for proposing a complex regional organization within the Classic Period Hohokam, participation in which was deemed necessary for all levels of local organization. Such a regional organization would have to have involved something of a "public economy" (Peebles and Kus, 1977), wherein production, exchange, and comsumption were all at least partly controlled at some level or levels above that of individual family units. When the regional support network broke down, the various local organizations followed suit, in decreasing order of complexity. Thus, those populations most dependent on organization, such as high density aggregated villages and towns, would "re-adapt" first. Those least dependent on organization, such as single family self-sufficient farmsteads, would be more resistant to change until population density in the area was too low to be viable socially, economically, religiously, or even genetically.

Such a model, developed out of information theory (Peebles and Kus, 1977), can be extended to the whole of the development of Classic Period Hohokam. As need for more rapid response (information processing) to environmental change increases, organization increases in complexity (channel capacity). Such a need would have arisen in the 11th century and stayed high through the 12th, 13th, and early 14th centuries. Final processing and social behavioral direction, according to this model, is invested in those persons or groups known or proven to be successful by virtue of ability or access to resources. Thus, the system at once diversifies and concentrates, increasing both channel capacity and information processing. It builds several hierarchical levels of organizational complexity, coordinated through a relatively small segment of the population. In real terms, as stress grows, the system utilizes more behavioral differentiation and more organization as a means to adapt to changing conditions. Decision making in this framework is organized into discrete levels. At the head of the hierarchy is a chief or some equivalent

central personage or group whose primary role is regulating behavior at the lower levels. This upper level is maintained by regulating exchange in subsistence and non-subsistence goods and services between locally different subsistence autonomies and smaller organizational systems. This regulation serves as a means to integrate the various components into a single system (Peebles and Kus, 1977) and involves the establishment and maintenance of social status distinctions by means of differential and/or prior access to all or to particular goods, services, and information. Thus, the development of the Hohokam early Classic Period can be seen as a function of increasing organization, regional adaptive (social and economic) diversification, and regulated exchange, with central or regional coordination through a chiefdom or higher level hierarchy. Indeed, if the rank society or chiefdom level of organization had been reached in the pre-Classic, as is becoming apparent (Doyel, 1978a; McAllister and Wood, 1978), then the Classic Period would have witnessed a development beyond that, reaching towards or attaining the level of a class-governed primitive state (McAllister and Wood, in press). However, higher levels of organization can have higher costs to a population in terms of resiliency if there is not sufficient technology or behavioral variability to back it up should it fail in some way. Without backup, if any part of one of the regional systems or the system as a whole fails, the system will break down by entropy. Dissolution takes place in successively decreasing levels of hierarchy until a new stable level is reached or until the entire system decomposes.

It is not yet known what exactly caused the final disintegration of the Hohokam system. It may have involved a change in the central exchange regulation mechanism or possibly a breakdown in trade relations with other systems. It may simply have been a failure of the available technology to support highly inflated population levels in the core area, culminating in warfare between the core area and peripheral populations, as suggested by certain Pima legends (Russel, 1908). It may even have come about as a result of bloody "peasant revolts" in the core area, as suggested by other Pima legends (Russel, 1908). Whatever the cause, it seems reasonable to assume that the final remnants of the Hohokam Classic Period system would reflect something of the former levels of complexity and behavioral differentiation posited by this model. The Pima, when first contacted by the Spanish, had a fairly strong tribal organization. Each village had a chief and these in turn elected a "tribal" chief. These chiefs had a considerable amount of authority in some matters, such as irrigation. The positions, subject to public opinion in the form of a council of elders, were based primarily on personal achievement. However, village chief positions were often "handed down" at the discretion of the outgoing chief. Also, individual identification with the village was often as strong or stronger than clan ties (Russel, 1908; Underhill, 1939). This type of organization may well reflect an origin in the larger political/ economic organizational system of the Classic Period Hohokam, one small segment of which was observed on the Superior proposed base for exchange.

Historic Patterns of Occupation

The pattern of historic Anglo settlement in the area has always been primarily a function of outside interests. Cattle ranching, the first sustained use of the area by Anglos, implies close interaction with a larger external market, of which the Arnett Ranch, apparently the first permanent Anglo settlement, was a part. Likewise, the military post was a function of a larger social and governmental structure which, in its most abstract, involved all the citizens of the Nation. More specifically, it functioned as an immediate expression of an areal, long term interaction between two social entities - the United States Army and the Apache. Finally, with the advent of mining in the area, there was another local expression of yet another organization-dependent market and society. The mining and milling operations of Silver King and Pinal probably represent the most sensitive organic relationship with an outside organization ever to operate in the Superior locality on a "permanent" basis. Cattle ranching, while market oriented, is at least potentially self-sufficient, utilizing cattle as a renewable subsistence resource. The military post, while more sensitive to short term organizational variation and changes in decision policy than any other type of settlement here, was originally conceived as a "limited activity" site, intentionally temporary. Mining, however, and its associated "habitation sites", was and is completely dependent on day to day exchange interactions with the outside consuming market for its livelihood. Silver ore, even in the hardest of times, does not make a particularly good subsistence resource. Mine towns themselves consume almost nothing of the resources they produce.

This organizational dependence can be seen in a number of ways. The high price of silver in the post-Civil War decades prompted the establishment of a number of mines and mining communities all over Arizona - towns as famous as Tombstone and as obscure as DeNoon. The costs of supporting these settlements at the far extremes of available supply networks were mitigated by the potential high profits to be had. The Silver King area was typical of what happened to most of the "boom towns" that grew out of all this. The profits obtained from the sale of silver interacting with the high price of what happened to most of the "boom towns" that grew out of all this. The profits obtained from the sale of silver interacting with the high price of ore processing, which was not available locally, prompted the founding of Pinal to serve as a millsite and provide homes for suddenly wealthy miners and the various providers of goods and services that wealth attracts and requires. While in operation, Pinal was self-supporting in the sense that all recognized necessities were provided. However, it was only so through the sale of a single luxury commodity in return for subsistence and lesser luxury commodities brought in from the outside world. The mill did not produce its own iron or steel or mill hammers; these were brought in from the foundries back east. The brewery did not make its own bottles or grow its own malt barely and the newspapers did not operate a paper mill with mesquite and palo verde pulp. Most construction materials, tools, and foodstuffs (beef excepted - Croxen, 1926) came from elsewhere. The town was built on the only available

agricultural land in the area. It depended for its needs on an organizational and economic system involving Prescott (the Territorial capital from 1877 to 1889), the agricultural communities of Phoenix and Tempe, the trade center of Tucson, Globe, and other small mine towns in the area which served as a market for goods and services distributed out of Pinal. All of these system components were connected by means of Wells Fargo, the Butterfield Stage Line, and the railroads to one focal point, as far as Pinal was concerned: San Francisco, where the milled ore was shipped for smelting, refining, and sale. As a result of the proliferation of mines brought on by the prices paid for silver in the 1860's and 70's, the price of silver dropped suddenly in 1888. When this happened Pinal, previously a vital and growing community went into a sharp, terminal decline (Wildman, 1977). By 1889 the population of the town was down to only 400 and by 1891 even the post office had shut down. It is not known how long after the post office closed that people stayed on, but by the time of the founding of Superior at about 1900, there were no indications that any part of the Pinal population remained.

Comparison and Implications

There are a considerable number of parallels between the development of the prehistoric and historic communities of Pinal. Both communities were colonies of larger regional systems seeking more or less specific resources, though the types of resources were disimilar - land and water were subsistence oriented, silver was market oriented. Both communities interacted with regional systems to varying extents, primarily in terms of exchange and social/political organization. When the regional systems retracted, the local systems also pulled back. First to go in both cases were the institutions most dependent on high levels or organization: the mining-milling-shipping complex of Pinal, the aggregated settlements of the Hohokam community. The resources which first prompted colonization were still available to both populations after their respective abandonments -water and arable land were still to be found near Queen Creek; silver and, more important later, copper were still present in the mines. Certain low level organizational forms ("stragglers") held out from both abandonments, only to finally succumb themselves as retraction of the larger systems became obviously permanent. The differences in subsistence strategies and the economic basis of relationship in the regional systems apparently did not matter once the systems began to decompose. As long as either local system was dependent on the regional system for organization or subsistence, its development was determined by trends in the larger system. The fact that so many parallels exist between the two histories argues strongly that both populations were involved in similar organizational frameworks, and that participation in a multi-level, multi-component regional organization was as vital for the Hohokam of the Superior locality as for the Anglo population of Pinal.

Summary and Conclusions

This report has dealt with a number of problems concerning the identity and distribution of the cultural resources in the Superior locality. Its primary goal has been to develop a settlement pattern analysis. This

analysis then served as a means to explain patterns of change and development and to make inferences concerning the patterns of behavior underlying those changes.

The purpose of settlement pattern analysis, as with all archeology, is to provide some insight into the operations of prehistoric behavior by means of inference from observable patterns and associations in the data. It is to be hoped that it will provide more than just the interesting but largely meaningless information that people used to live in a place. By doing this sort of analysis, something can be learned of why and how they lived there as well, how they related to each other and how they related to those around them. In this particular case, it is also to look at something of the variety of ways in which an environment can be utilized and how such uses might involve differential levels of organization and integration. From relationships such as these, the types of criteria which operate for the inception and disruption of social/economic systems may eventually be determined. It is felt that this study has dealt with some aspects of this problem by means of inferences from the data and parallels between the historic and prehistoric populations.

The fact that this study was done as an aspect of a program of cultural resource management brings up a final point, that even the most minimal of archeological investigations, the clearance survey, is capable of providing a useful quantity of data on the subsistence systems and culture history of an area. While data of this level must necessarily be seen as preliminary and open to (as well as directing) further investigation and testing, it is nevertheless useful for a variety of analyses as it stands. It can often provide environmental and cultural historical information for areas which might otherwise be unknown or unreported. This last point is probably the most important contribution that management-related studies of this type can make. Since clearance surveys are not generally located by the specific needs of archeological research programs, they tend to put archeologists into places they might never think or choose to go. This cannot help but widen the data base for all of archeology - areas with and without cultural resources - providing valuable information for both anthropological research and land use planning, based on the characteristics and distribution of archeological properties.

Final Note: Any discrepancies the reader may note between this report and its previous versions are primarily the result of incorporating data from some preliminary analysis of the excavation materials by Smith, a second survey in the area (Wood, 1976b), and a series of revisits to Pinal in 1977 and 1978, during which some additional information was recorded for many of the prehistoric and historic properties in the vicinity. As a result of this additional work, a number of previous evaluations were re-evaluated in 1977 and revised in 1978. But what the hell, nobody's always right the first time.

Lastly, my apologies to John Antieau for not crediting him in the text for the name "Gila Plain, Queen Creek Variety". In all truth, I developed the same description and type name quite independently, and probably earlier. I can blame only myself that he beat me to press (Antieau, 1977).

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